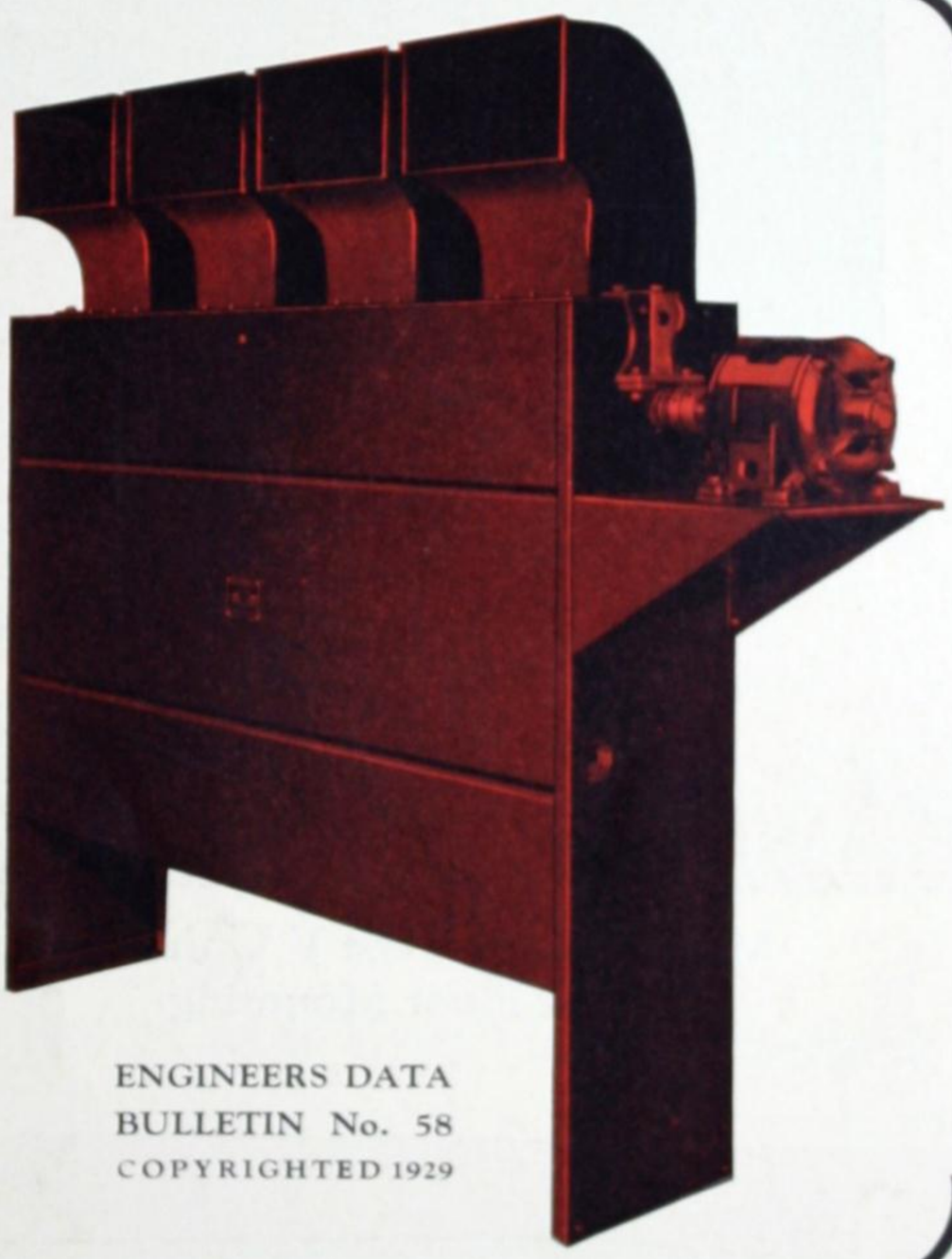
A. I. A. FILE No. 30 D11

MASSACHUSETTS

UNIT HEATERS

TYPES "V" AND "C"



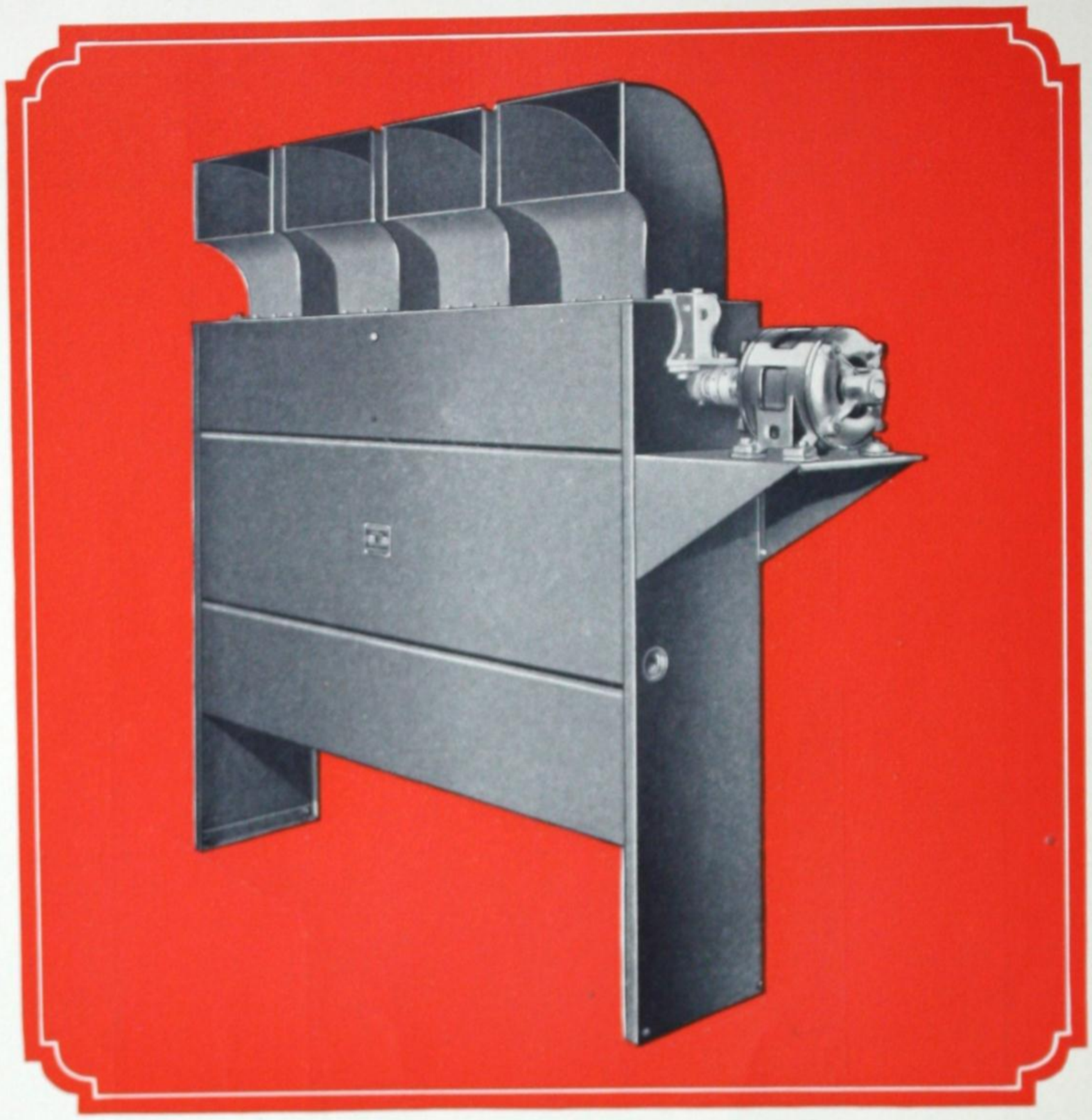
ENGINEERS DATA
BULLETIN No. 58

MASSACHUSETTS BLOWER DIVISION
of
THE BISHOP & BABCOCK SALES CO.
General Offices - 4901 - 4915 Hamilton Ave. N.E.
CLEVELAND, OHIO.

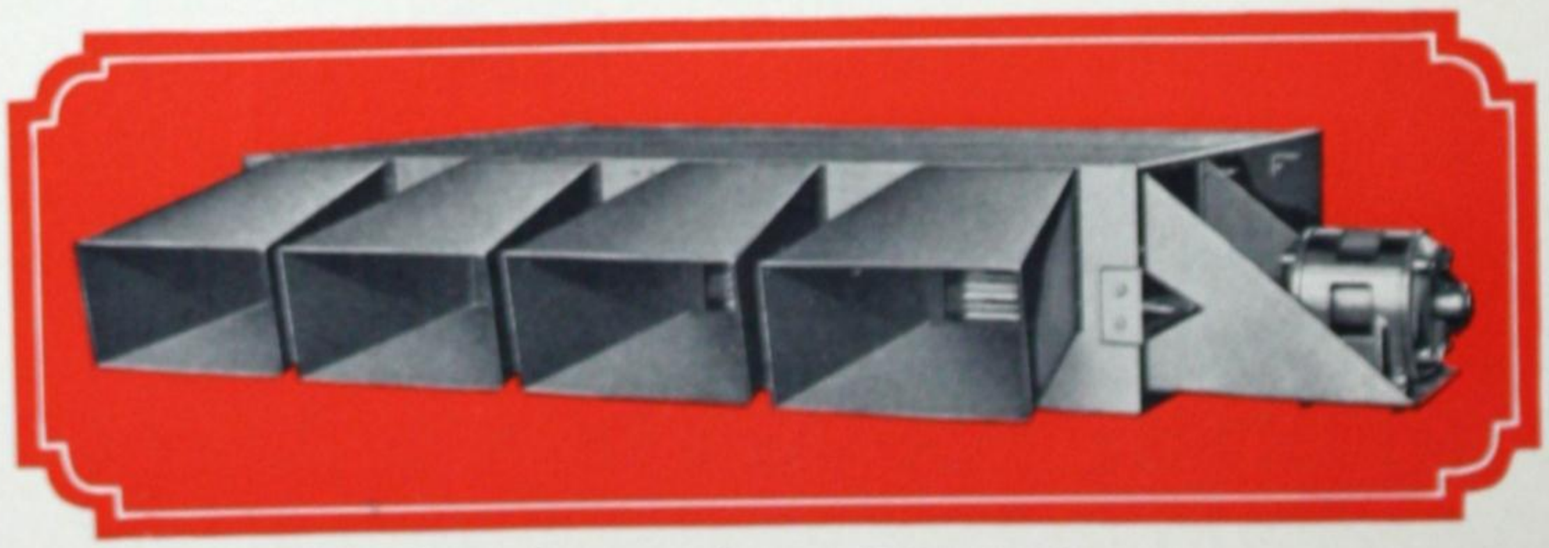
A. I. A. FILE No. 30 D11

heating ventilation

MASSACHUSETTS



Massachusetts Type V Unit Heater
For Floor Mounting



Massachusetts Type C Unit Heater
For Ceiling Suspension

The B&B Line

The Bishop & Babcock Line of Massachusetts Unit Heaters

The development of the Unit Heater System of heating and ventilating has progressed to a point where an insistent demand is voiced for a revolutionary improvement in design, operation, appearance and efficiency of the Unit Heater.

In response to this demand, we present the New Massachusetts Modified Unit Heater in both floor and ceiling types in which are incorporated numerous improvements in design, efficiency and operation—the result of many experiments and tests. We believe it to be the most efficient line of Unit Heaters made.

Massachusetts Type V Unit Heater (Floor Type)

The design is in strict accordance with the fundamental laws of air circulation. The unit, drawing cool air from a point just above the floor level and discharging horizontally at high velocity just above the breathing or working zone, distributes the heated air in the breathing zone and not in the upper areas where it is wasted by causing a considerable increase in heat transmission through the roof and upper walls.

Heated air can be deflected downward by means of baffles, etc., but will rebound unless the cooler air at the lower levels is withdrawn. The air inlet of Massachusetts Type V Unit Heaters, being just above the floor level, removes the lower strata of cool air, and allows the warmer strata in the breathing zone to fall, thus insuring a uniform temperature.

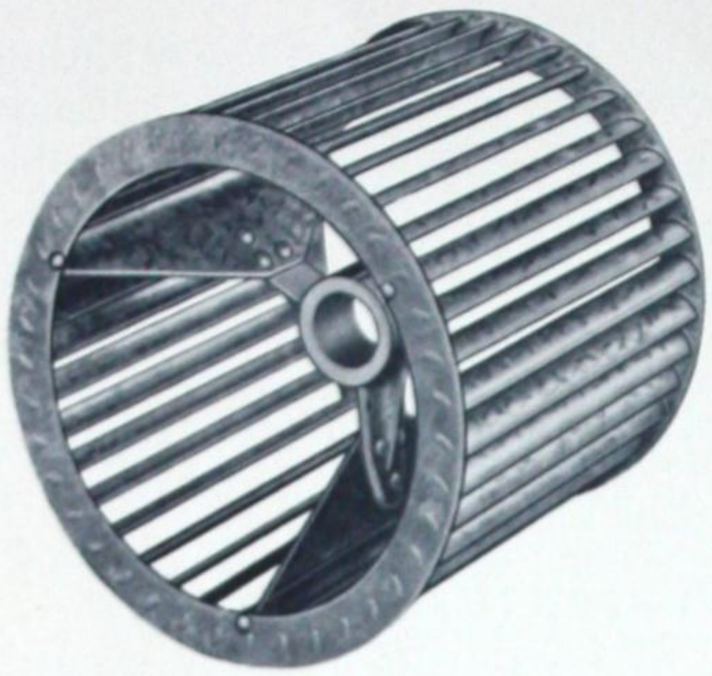
The Bishop & Babcock line of Massachusetts Unit Heaters presents the latest, most efficient and economical means of heating and ventilating large areas such as manufacturing plants, factory offices, gymnasiums, prisons, commercial garages, etc., and in addition, applications are found in the industrial drying field.

Massachusetts Type C Unit Heater (Ceiling Type)

For installations where floor space is not available for placing of the units we recommend the Massachusetts Type C Unit Heater for ceiling suspension. This unit is similar in design, construction and performance to the Type V Units except that the air flows through the units in a horizontal plane. The Type C Unit is equipped with special discharge connections controlling the angle of air deflection downward, according to the requirements of the particular installation.

The overall efficiency of any ceiling mounted unit is less than that of a floor mounting due to the loss of aspirating or stack effect in the unit and slightly higher inlet temperatures prevailing in the upper areas. However, due to the extremely high outlet velocities induced by the Massachusetts Type C Unit Heater, these losses are reduced to a minimum.

Construction Details of Massachusetts Type V and C Modified Unit Heaters



Fans

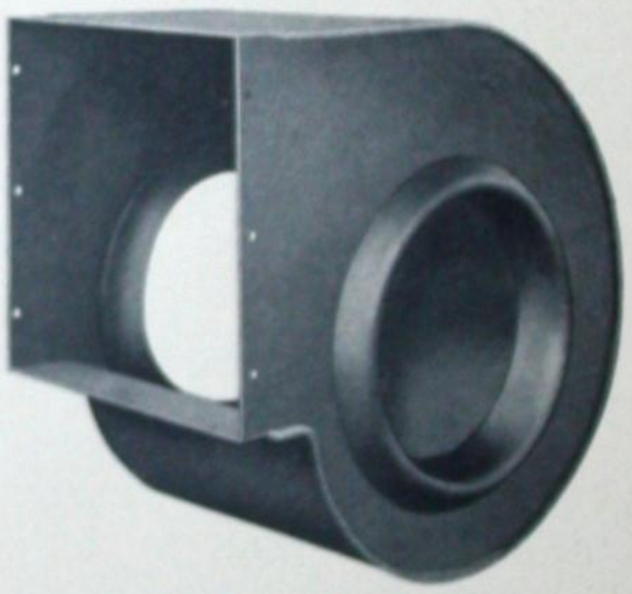
Massachusetts Type V and C Unit Heaters are equipped with a series of double width double inlet Massachusetts Squirrel Cage Fans mounted on a common shaft, the number of fans depending on the size of the unit. These fans are designed to combine rigid construction and great strength with entrance to the blades free from obstruction. The blades and annular rings are formed in dies so that each is an exact duplicate of the others. This uniformity of thickness and weight gives the nice balance necessary to prevent deflection, distortion or vibration at high speeds. Projections on the ends of each blade protrude through formed slots in the annular rings, and are rivetted over in special machines designed for this particular purpose. The three-arm spider of malleable iron is securely rivetted to the three extended main blades producing extreme rigidity.

After fabrication, each wheel is hot galvanized, which positively prevents rattling of the floats, and protects the entire wheel against rust and erosion.

Each wheel is given an accurate static balance, and, as a measure to insure absolute freedom from vibration, the entire fan assembly, on its own shaft is put into dynamic balance at its speed of operation.

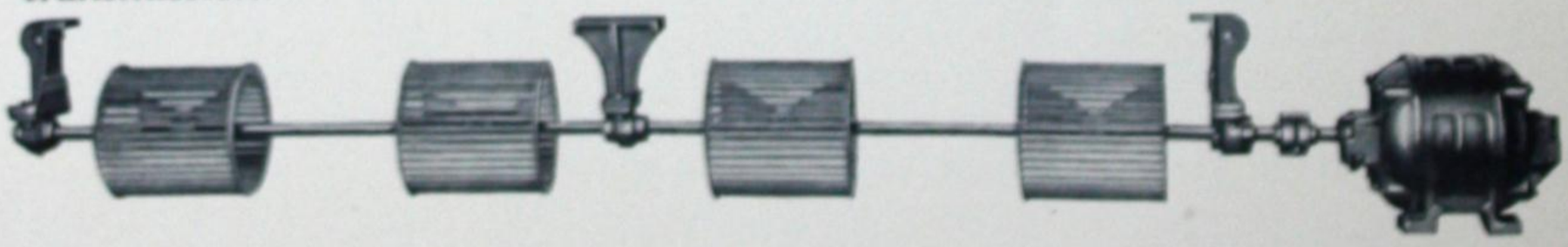
Fan Casings

The special problem of producing a fan housing of efficient design, combined with necessary lightness of weight has been solved in this unit. The sides, including the low loss inlet cone and flanged stiffeners around the edges are each pressed from one piece of deep drawing steel. The scroll sheets are spot welded to the flanged casing sides.

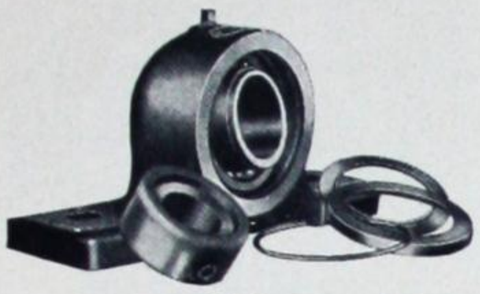


Shaft, Bearings and Couplings

The shafts, of high carbon steel, ground and polished to exacting dimensions, are sized for negligible deflection, which provides ample safety in load transmission.



Whipping of the shaft, a common occurrence in unit heaters of this type, has been entirely eliminated by the use of three bearing supports on the larger sizes.



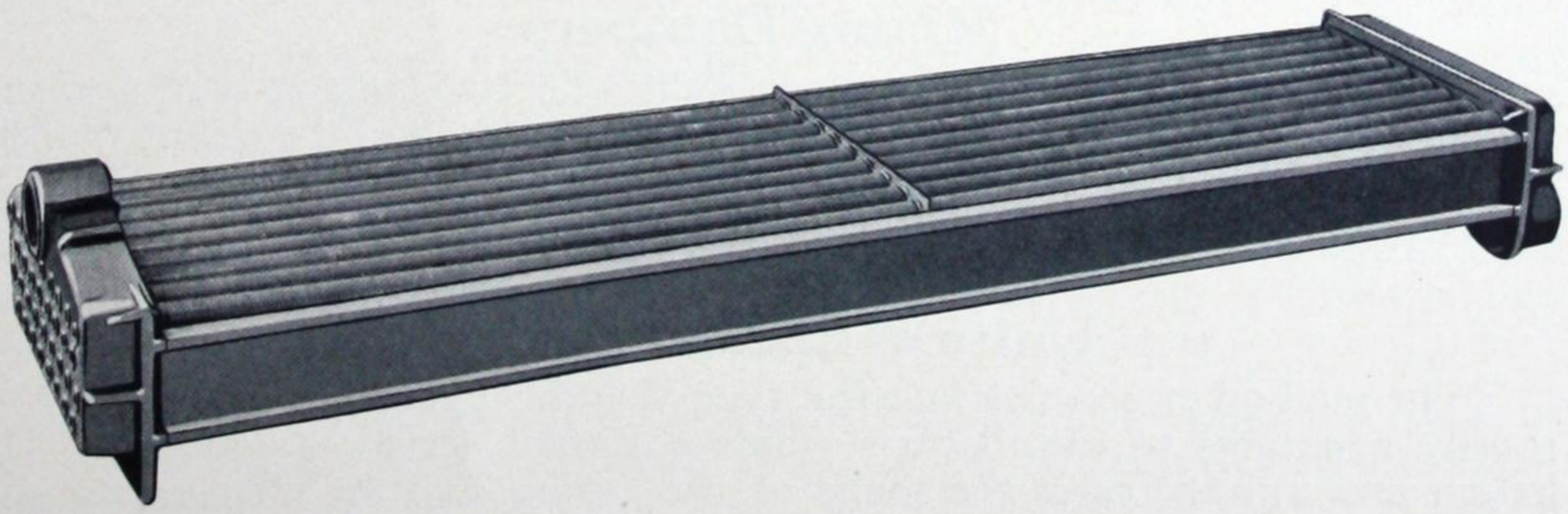
Fafnir Self-Aligning Pillow Block Ball Bearings fitted for Alemite lubrication, have been accepted as standard on all units. The end bearings are mounted on special cast iron brackets, which are provided with holes for crane hooks to facilitate handling of the top assembly and complete unit heater. The possibility of misalignment of the bearings has been precluded by floating the center bearing on a heat resistant rubber cushion and by providing a high-grade flexible coupling between the motor drive and the fan shaft.

Casings

Heavy steel plates forming the ends are spot welded to the side sheets to form a rigid, substantial heater casing. Grooves pressed into the side sheets and running the length of the casing, furnish stiffening for these sheets and support for the heater section.

Heater Section

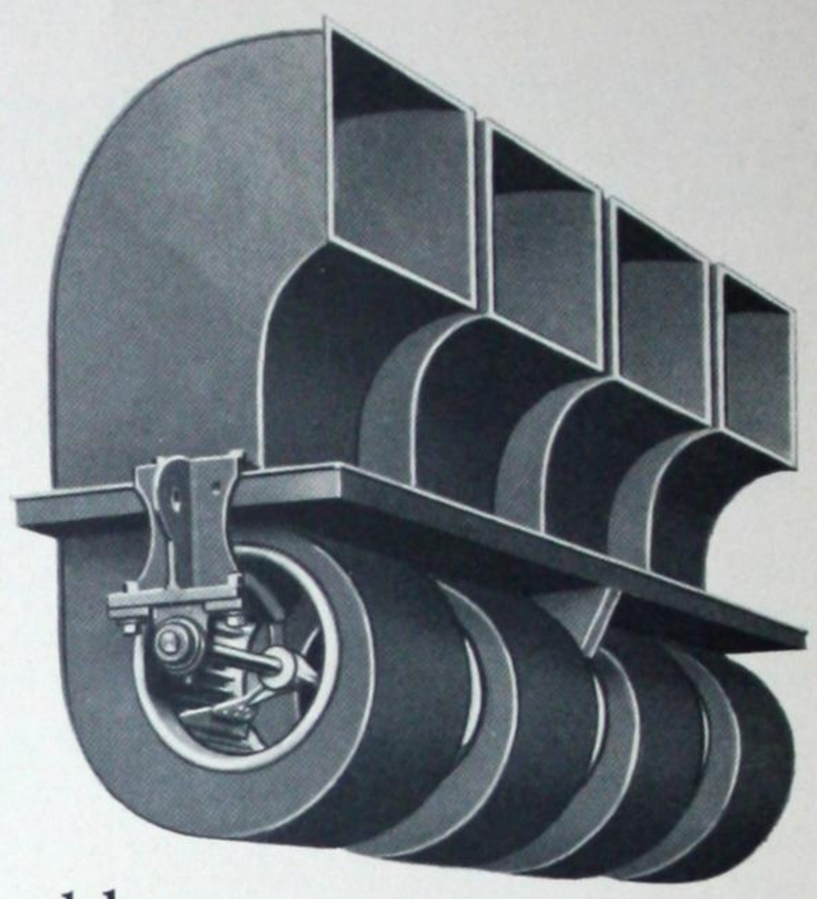
High Pressure B & B special heating sections, designed for 200 lbs. per square inch steam working pressure, and tested at 250 lbs. hydrostatic pressure, is used exclusively. Tinned copper tubes and fins, the former rolled into cast iron headers, form a heater element of highest efficiency with boiler type construction.



A removable panel in the end sheet permits access to the heater section which may be slid out like a drawer, for cleaning or inspection.

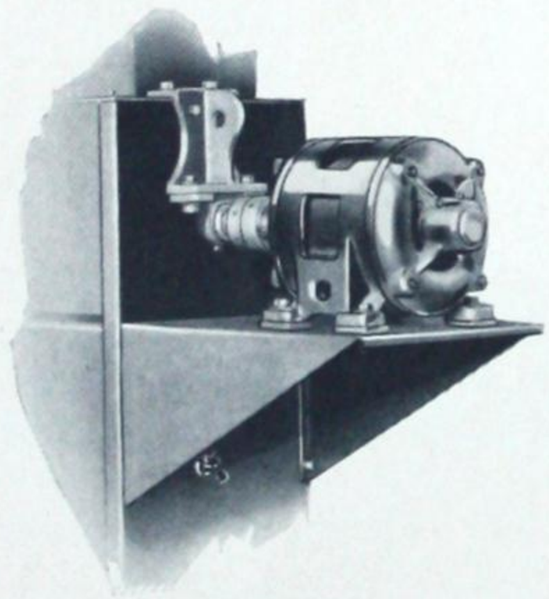
Cowls

A sheet metal discharge cowl of scientific and practical design is supplied for each outlet. The standard cowls may be turned in any one of four directions on the square fan outlets and will discharge the air in a plane just above the breathing zone. Cowls with special angles of discharge can be furnished when required.



Top Assembly

Fan housing, wheels, shaft, bearings and discharge cowls form a complete assembly on the rigid top sheet which fits like a lid on the heater casings. Removal of a few very accessible bolts will allow the entire top assembly to be lifted off by the bearing brackets, which are provided with holes for the crane hooks.



Motors

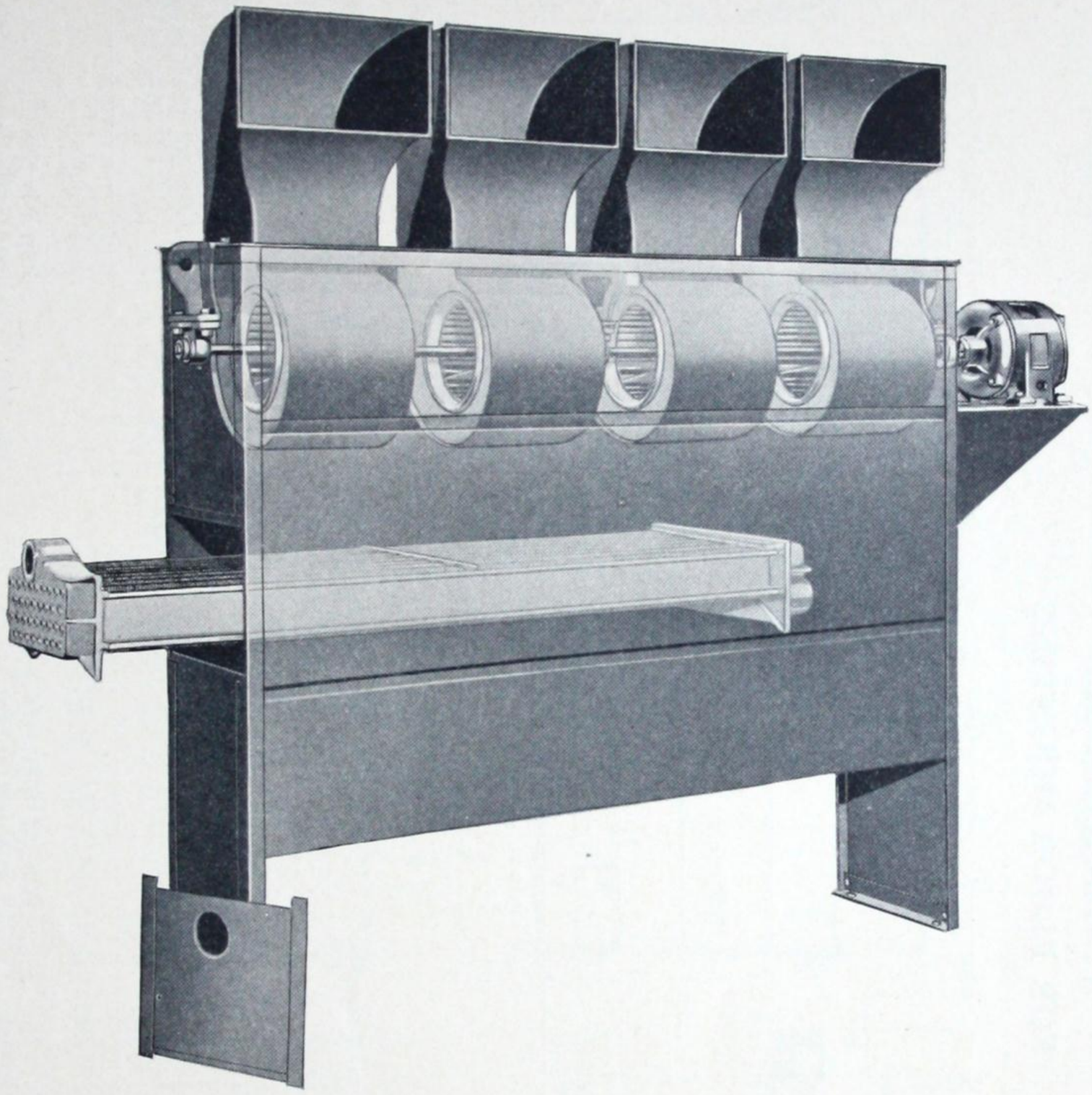
All units are powered by standard commercial ball-bearing motors of high-grade manufacture. The motor is mounted on live rubber cushions, secured to a substantial structural steel bracket by bolts through rubber bushings and washers, preventing motor noise and vibration being transmitted to the heater casing.

Mixing Dampers

When desired, manual or automatically operated mixing dampers, and fresh air wall boxes may be furnished for both the floor and the ceiling models. By the use of these dampers fresh air may be taken from the outside, the inside air may be recirculated, or a mixture of both may be had.

Units of Special Design

The method of constructing the type V and C Unit Heaters makes them readily adaptable to installations where a special design is desirable. The length and in some cases the shape of the casing may be changed to suit conditions, also the length and type of the discharge cowls. Filters may be installed in the units, and any type of drive may be used. In installations where a relatively large number of units are required, special designs can often be had at no increase in cost.

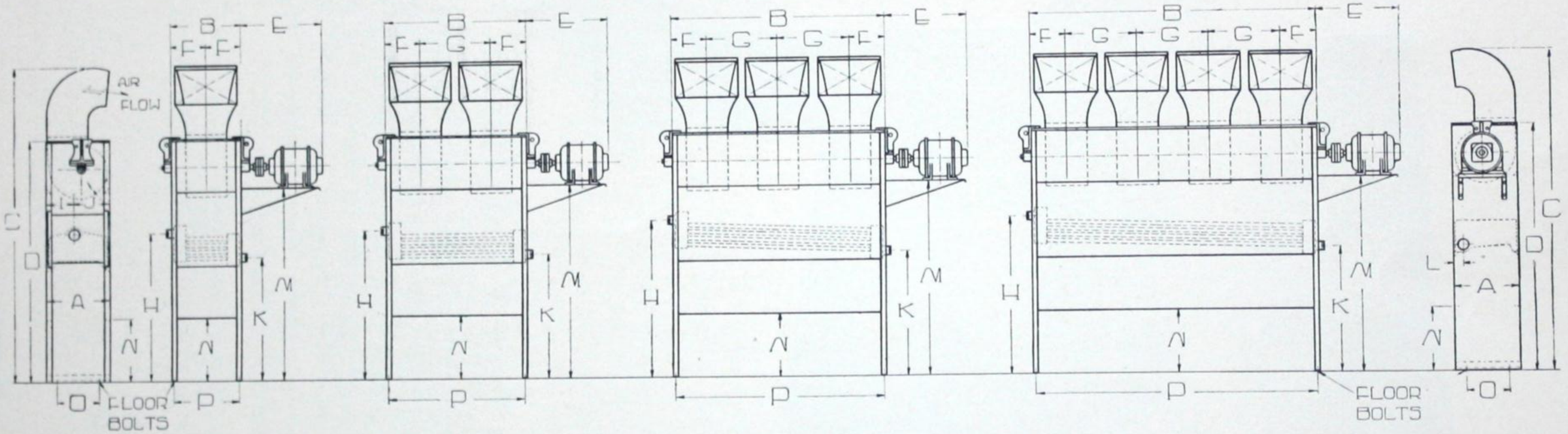


Massachusetts Type V Unit Heater

The labor involved in the installation of these units has been reduced to a minimum. Shipment is made with the cowls and heater section separate, which so lightens the unit that it may be handled by two men without the aid of a crane. It is a simple and easy operation to remove the panel in the end and slide the heater section into the casing. The cowls, which come packed in substantial cartons, to protect them from damage in transit and on the job, are readily slipped onto the fan outlets and secured.

Each unit is finished with two coats of high grade lacquer, in a shade of rich maroon which harmonizes with and enhances the appearance of its surroundings.

Dimensions
Massachusetts Type "V" Unit Heater
18-inch Model
FOR FLOOR MOUNTING



SUPPLY END No. 200 | No. 400 | No. 600 | No. 800 | RETURN END

Unit No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Size of Tappings Steam	Size of Tappings Drip	Floor Space Sq. Ft.	Size Outlet Cowl	Total Ship'g Weight
200	18	32½	90	69	18⅞	16¼	22¼	42½	7 13/16	10 3/16	35⅛	2½	54⅞	18	14	29½	2½	2½	4.00	10⅜x18½	775
400	18	44½	90	69	21⅛	11⅛	22¼	42½	7 13/16	10 3/16	35⅛	2½	54⅞	18	14	41½	2½	2½	5.56	10⅜x18½	930
600	18	68½	90	69	21⅛	11⅜	22¾	44⅜	7 13/16	10 3/16	35⅛	2½	54⅞	18	14	65½	2½	2½	8.50	10⅜x18½	1130
800	18	86½	90	69	21⅞	10 13/16	21 9/16	44⅜	7 13/16	10 3/16	35⅛	2½	54⅞	18	14	83½	2½	2½	10.10	10⅜x18½	1230

Heating Sections:

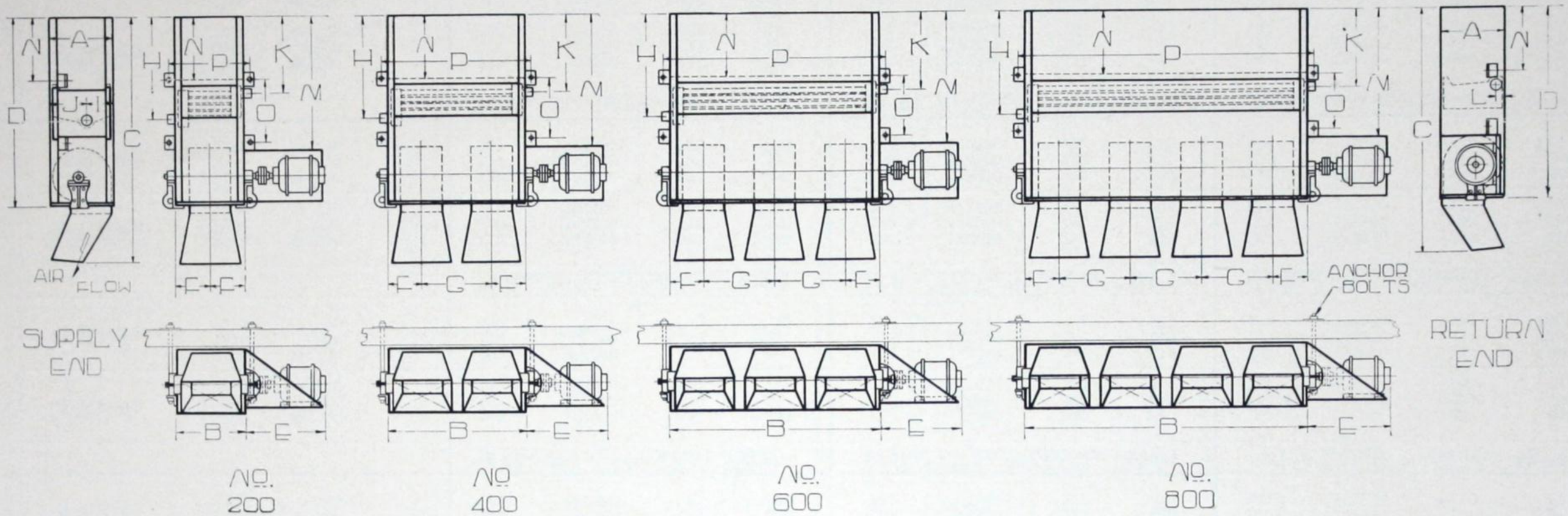
	3 Row	4 Row
No. 200	53 Lineal feet Tubing	71 Lineal feet Tubing
No. 400	78 Lineal feet Tubing	105 Lineal feet Tubing
No. 600	128 Lineal feet Tubing	173 Lineal feet Tubing
No. 800	165 Lineal feet Tubing	224 Lineal feet Tubing

Fan Wheels:

No. 200	1-10½" diameter S. C. Fan
No. 400	2-10½" diameter S. C. Fans
No. 600	3-10½" diameter S. C. Fans
No. 800	4-10½" diameter S. C. Fans

Dimensions
Massachusetts Type "C" Unit Heater
18-inch Model

FOR CEILING SUSPENSION



Unit No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Size of Tappings		Ceil'g Space Sq. Ft.	Size Outlet Cowl	Total Ship'g Weight
																	Steam	Drip			
200	18	32½	72	54	19⅛	16¼	.....	30	7 13/16	10 3/16	22⅝	2½	39	18	20	36	2½	2½	18.5	9x20	765
400	18	44½	72	54	21⅛	11⅛	22¼	30	7 13/16	10 3/16	22⅝	2½	39	18	20	48	2½	2½	26.5	9x20	915
600	18	68½	72	54	21⅛	11⅜	22¾	30	7 13/16	10 3/16	22⅝	2½	39	18	20	72	2½	2½	39.5	9x20	1100
800	18	86½	72	54	21⅞	10 13/16	21 9/16	30	7 13/16	10 3/16	22⅝	2½	39	18	20	90	2½	2½	44.5	9x20	1205

Heating Sections:

	3 Row	4 Row
No. 200	53 Lineal feet Tubing	71 Lineal feet Tubing
No. 400	78 Lineal feet Tubing	105 Lineal feet Tubing
No. 600	128 Lineal feet Tubing	173 Lineal feet Tubing
No. 800	165 Lineal feet Tubing	224 Lineal feet Tubing

Fan Wheels:

No. 200	1-10½" diameter S. C. Fan
No. 400	2-10½" diameter S. C. Fans
No. 600	3-10½" diameter S. C. Fans
No. 800	4-10½" diameter S. C. Fans

No. 200 MASSACHUSETTS TYPES "V" and "C" UNIT HEATERS

FLOOR AND CEILING MODELS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
70°F.	4 Rows	2090	●1150	½	125.5	121250	125	505	135.5	141850	149	585	162	192210	215	795
		1560	860	¼	130	97970	101	405	141	114240	120	475	169	154660	173	645
		1290	* 710	⅛	135.5	87300	90	365	147	101860	107	425	178	137680	154	575
	3 Rows	2100	●1150	½	115	98940	102	410	123	115190	121	480	142.5	155560	174	650
		1570	860	¼	119	80510	83	335	128	93300	98	390	150	126950	142	530
		1295	* 710	⅛	123	71780	74	300	132.5	83780	88	350	156.5	112640	126	470
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	2090	●1150	½	131	132480	138	550	145	160480	172	670	170	207450	239	865
		1560	860	¼	136	106560	111	445	150	127820	137	535	176.5	166660	192	695
		1290	* 710	⅛	141.5	95040	99	395	157.5	114760	123	475	188.5	149300	172	620
	3 Rows	2100	●1150	½	120	107520	112	450	130	130620	140	545	149.5	168390	194	700
		1570	860	¼	123	87360	91	365	135	105430	113	440	157	137140	158	570
		1295	* 710	⅛	129	77760	81	325	141	94230	101	390	164	121520	140	505
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
60°F.	4 Rows	2090	●1150	½	119.5	131920	136	550	129.5	152320	160	635	155.5	202940	227	845
		1560	860	¼	124.5	106700	110	445	135	122810	129	510	163.5	163600	183	680
		1290	* 710	⅛	129.5	94090	97	390	141.5	108530	114	450	172	144830	162	600
	3 Rows	2100	●1150	½	108	107670	111	450	115.5	123760	130	515	136	165390	185	690
		1570	860	¼	112	87300	90	365	121.5	101860	107	425	143.5	134990	151	560
		1295	* 710	⅛	116.5	77600	80	325	126.5	90440	95	375	150.5	119800	134	500
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	2090	●1150	½	125	143040	149	595	138.5	170740	183	710	164	218740	252	910
		1560	860	¼	130	115200	120	480	145.5	138080	148	575	173	176200	203	735
		1290	* 710	⅛	150.5	101760	106	425	151.5	121290	130	505	181	155370	179	645
	3 Rows	2100	●1150	½	112	116160	121	485	123	139020	149	580	142.5	177940	205	740
		1570	860	¼	117	95040	99	395	129	113820	122	475	151	145820	168	605
		1295	* 710	⅛	121.5	84480	88	350	135	100760	108	420	160	129330	149	540
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
50°F.	4 Rows	2090	●1150	½	113.5	142590	147	595	123.5	162790	171	675	149	213670	239	890
		1560	860	¼	118	113490	117	470	129	130420	137	545	157	170750	191	710
		1290	* 710	⅛	123	101850	105	425	136	116140	122	485	167	152870	171	635
	3 Rows	2100	●1150	½	100.5	114460	118	475	108.5	131380	138	550	129	172540	193	715
		1570	860	¼	105	93120	96	390	113.5	106620	112	445	135.5	140360	157	585
		1295	* 710	⅛	110	83420	86	345	119	95200	100	395	144.5	126050	141	525
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	2090	●1150	½	119	153600	160	640	133	181940	195	760	158	229150	264	955
		1560	860	¼	124	122880	128	510	139.5	145550	156	605	166.5	183150	211	765
		1290	* 710	⅛	130.5	109440	114	455	147	129690	139	540	177	163180	188	680
	3 Rows	2100	●1150	½	105	123840	129	515	115.5	146480	157	610	135	184880	213	770
		1570	860	¼	110	100800	105	420	122	119420	128	500	143	150160	173	625
		1295	* 710	⅛	115.5	90240	94	375	127.5	106360	114	445	151.5	134540	155	560

No. 200 Massachusetts Types "V" and "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
30°F.	4 Rows	2090	●1150	½	100	161990	167	675	109	180880	190	755	134.5	231550	259	965
		1560	860	¼	106	130950	135	545	115.5	145660	153	605	143	185950	208	775
		1290	* 710	⅛	112	115430	119	480	124	128520	135	535	152.5	164500	184	685
	3 Rows	2100	●1150	½	86.5	132890	137	550	93.5	147560	155	610	112.5	187740	210	780
		1570	860	¼	91.5	107670	111	450	100	120900	127	505	122	154660	173	645
		1295	* 710	⅛	96.5	95060	98	395	105	106620	112	445	128.5	135890	152	565
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	2090	●1150	½	105	172800	180	720	118	199660	214	830	142	246510	284	1030
		1560	860	¼	111.5	139200	145	580	126	161410	173	670	152	197900	228	825
		1290	* 710	⅛	118.5	122880	128	510	132	141820	152	590	162.5	175340	202	730
	3 Rows	2100	●1150	½	90.5	141120	147	585	101	163280	175	675	119.5	201340	232	840
		1570	860	¼	96.5	115200	120	480	107.5	133420	143	555	128	164050	189	685
		1295	* 710	⅛	101	101760	106	425	113.5	117560	126	490	136	144960	167	605
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
0°F.	4 Rows	2090	●1150	½	80.5	194000	200	810	87.5	209440	220	870	111	255680	286	1065
		1560	860	¼	86.5	156170	161	650	95	168500	177	700	120	206510	231	865
		1290	* 710	⅛	93.5	137740	142	575	102	147560	155	615	129	180590	202	750
	3 Rows	2100	●1150	½	63	157140	162	655	69.5	169460	178	705	86	207410	232	870
		1570	860	¼	70.5	128040	132	535	77.5	138040	145	575	95	169160	189	705
		1295	* 710	⅛	76	113490	117	470	83	122810	129	510	103.5	149300	167	620
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	2090	●1150	½	85	203520	212	845	96.5	227650	244	945	116.5	267340	308	1110
		1560	860	¼	92.5	164160	171	685	105	183800	197	765	127.5	216130	249	900
		1290	* 710	⅛	99	144000	150	600	112.5	161410	173	670	136	189220	218	790
	3 Rows	2100	●1150	½	67	165120	172	690	76	184730	198	770	92	217000	250	905
		1570	860	¼	74	134400	140	560	84	150210	161	625	102	177070	214	740
		1295	* 710	⅛	81.5	119040	124	495	91	133420	143	555	109.5	157110	181	655

1. C. F. M.—The cubic feet of air per minute ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 1150 and 860 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, Direct Current or single phase, 2-phase, or 3 phase Alternating Current.

●The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160°F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32°F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

No. 400 MASSACHUSETTS TYPES "V" and "C" UNIT HEATERS

FLOOR AND CEILING MODELS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
70°F.	4 Rows	4060	●1150	1	122	221740	229	925	132	259420	273	1080	156	350900	393	1465
		3050	860	½	126.5	179530	185	750	137	209920	221	875	163.5	283850	318	1325
		2520	* 710	¼	129.5	156240	161	650	140	182310	192	760	168.5	246750	276	1030
	3 Rows	4080	●1150	1	111	175640	181	735	118.5	205630	216	860	137	278040	311	1160
		3060	860	½	115	144050	148	600	123	168050	177	700	143	227250	254	950
		2530	* 710	¼	118	127120	131	530	127	150000	157	625	149	201150	225	840
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	4060	●1150	1	127	242400	253	1010	141	293900	315	1225	164	379750	438	1580
		3050	860	½	132.5	195840	204	815	146.5	237450	260	990	172	306400	353	1280
		2520	* 710	¼	135.5	156240	178	710	150.5	206200	221	860	177.5	266910	308	1110
	3 Rows	4080	●1150	1	115	192000	200	800	125	232790	250	970	142	300760	347	1255
		3060	860	½	119.5	157000	164	655	130.5	190500	204	795	150	245000	283	1020
		2530	* 710	¼	122.5	138720	145	580	134.5	167940	180	700	156	217000	250	905
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
60°F.	4 Rows	4060	●1150	1	115.5	239110	247	995	125	276080	290	1150	149	368330	412	1535
		3050	860	½	120.5	194490	201	810	131	225150	237	940	157.5	299940	336	1250
		2520	* 710	¼	123.5	168780	174	705	134	195160	205	815	162.5	259710	291	1080
	3 Rows	4080	●1150	1	104	191090	197	800	111	220390	232	920	129.5	294580	330	1225
		3060	860	½	107.5	155200	160	650	115.5	179450	189	750	136	239150	268	995
		2530	* 710	¼	110.5	136770	141	570	119.5	158030	166	660	141	210540	236	880
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	4060	●1150	1	120.5	259200	270	1080	133.5	310230	333	1295	157	396680	457	1650
		3050	860	½	127	211200	220	880	140	252400	272	1050	166.5	322900	372	1345
		2520	* 710	¼	129	182880	191	760	144.5	218790	235	915	172	279500	322	1165
	3 Rows	4080	●1150	1	107.5	206880	216	860	117	247710	266	1035	135.5	316820	365	1320
		3060	860	½	112	168480	176	705	123.5	201060	216	840	143	257800	297	1075
		2530	* 710	¼	115.5	148320	160	620	127	177270	190	740	148.5	226980	262	945
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
50°F.	4 Rows	4060	●1150	1	109	256570	265	1070	118	292740	308	1220	141.5	383980	430	1600
		3050	860	½	114.5	208550	215	870	124.5	238000	250	995	150.5	311560	349	1300
		2520	* 710	¼	117.5	180910	187	755	128	206590	217	860	156	270440	303	1130
	3 Rows	4080	●1150	1	96.5	205640	212	860	103.5	234670	247	980	122	307990	345	1285
		3060	860	½	101	167330	173	700	108.5	190880	201	795	129	250320	280	1045
		2530	* 710	¼	104	146960	152	615	112	167550	176	700	133.5	219480	246	915
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	4060	●1150	1	114	276480	288	1150	127	327490	351	1365	150	413170	476	1720
		3050	860	½	119.5	224640	234	940	134	265910	285	1110	160	335920	387	1400
		2520	* 710	¼	123	194880	203	815	138	230920	248	965	165.5	291220	336	1215
	3 Rows	4080	●1150	1	100.5	221760	231	925	110.5	262640	282	1095	128.5	331140	382	1380
		3060	860	½	105	180480	188	755	116	213660	229	896	135.5	269520	311	1125
		2530	* 710	¼	108.5	158400	165	660	120	187540	201	780	141	236530	273	985

No. 400 Massachusetts Types "V" and "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
30°F.	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
	4 Rows	4060	●1150	1	95	291970	301	1215	103.5	326600	343	1360	126.5	417500	467	1740
		3050	860	½	101	238140	246	995	110	266560	280	1110	136.5	340170	381	1420
		2520	* 710	¼	104.5	206000	213	860	114	229430	241	905	141.5	293680	329	1225
	3 Rows	4080	●1150	1	81.5	235230	243	980	88	262750	276	1095	106.5	336590	377	1405
		3060	860	½	86.5	191580	198	800	93.5	214200	225	895	113.5	273570	306	1140
		2530	* 710	¼	89.5	167330	173	700	97	186590	196	780	118	236700	267	995
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	4060	●1150	1	100	312000	325	1300	112.5	362940	389	1510	134	443550	511	1850
		3050	860	½	106	254400	265	1060	120.5	296230	318	1235	145	361960	417	1505
		2520	* 710	¼	110	219360	229	915	124.5	255640	274	1065	150.5	312480	360	1300
	3 Rows	4080	●1150	1	85.5	251520	262	1050	95	292500	314	1220	112	357670	412	1490
		3060	860	½	90.5	204480	213	855	101	237920	255	995	119.5	290780	335	1215
		2530	* 710	¼	92.5	178560	186	745	105.5	207590	223	865	124.5	253890	293	1060
0°F.					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
	4 Rows	4060	●1150	1	74	346780	358	1445	80.5	373660	393	1555	102	457730	512	1910
		3050	860	½	81	282760	292	1180	88.5	304640	320	1270	111.5	372800	417	1555
		2520	* 710	¼	84	244930	253	1020	92.5	263700	277	1100	117.5	323180	362	1345
	3 Rows	4080	●1150	1	59	281300	290	1170	63.5	302740	318	1260	81.5	371000	415	1545
		3060	860	½	63	228440	236	955	70.5	246090	259	1025	88	301730	336	1255
		2530	* 710	¼	67.5	198850	205	830	74	214200	225	895	92.5	261940	293	1090
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	4060	●1150	1	77.5	363840	379	1515	88	405860	435	1690	107.5	478270	551	1990
		3050	860	½	86	296640	309	1235	97	331220	355	1380	118	390600	450	1630
		2520	* 710	¼	90	256800	268	1070	102	286900	308	1195	125.5	342430	395	1430
	3 Rows	4080	●1150	1	63	295200	308	1230	70	329350	353	1370	85.5	388430	448	1620
		3060	860	½	67	240000	250	1000	77	268240	288	1120	93	315950	364	1320
		2530	* 710	¼	72	208800	218	870	81	233250	250	975	97.5	274710	317	1145

1. C. F. M.—The cubic feet of air per minute ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 1150 and 860 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, Direct Current or single phase, 2-phase, or 3 phase Alternating Current.

●The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160°F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32°F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

No. 600 MASSACHUSETTS TYPES "V" and "C" UNIT HEATERS

FLOOR AND CEILING MODELS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
70°F.	4 Rows	6090	●1150	1½	122	332600	343	1385	132	389130	409	1620	156	526340	589	2195
		4575	860	¾	126.5	269290	278	1125	137	314870	301	1310	163.5	425770	476	1985
		3780	* 710	½	129.5	234350	242	975	140	273460	287	1140	168.5	370120	414	1540
	3 Rows	6120	●1150	1½	111	263460	272	1100	118.5	308450	324	1285	137	417050	467	1740
		4590	860	¾	115	216080	223	900	123	252080	265	1050	143	340880	381	1420
		3795	* 710	½	118	190680	197	795	127	225000	236	940	149	301730	338	1255
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	6090	●1150	1½	127	363600	379	1515	141	440840	473	1835	164	569630	656	2370
		4575	860	¾	132.5	293760	306	1225	146.5	356170	382	1480	172	459600	530	1915
		3780	* 710	½	135.5	255600	266	1065	150.5	309290	332	1290	177.5	400370	461	1665
	3 Rows	6120	●1150	1½	115	288000	300	1200	125	349180	374	1450	143	451140	520	1880
		4590	860	¾	119.5	235500	245	985	130.5	285750	305	1195	150	367500	424	1530
		3795	* 710	½	122.5	208080	217	865	134.5	251910	270	1050	156	325500	375	1355
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
60°F.	4 Rows	6090	●1150	1½	115.5	358660	370	1495	125	415550	435	1725	149	552500	618	2305
		4575	860	¾	120.5	291730	301	1215	131	239150	355	1405	157.5	449900	503	1875
		3780	* 710	½	123.5	253170	261	1055	134	294170	308	1220	162.5	389560	436	1620
	3 Rows	6120	●1150	1½	104	286640	300	1195	111	332010	347	1380	129.5	441860	494	1840
		4590	860	¾	107.5	232800	240	970	115.5	270600	283	1120	136	358720	401	1495
		3795	* 710	½	110.5	205160	212	855	119.5	238470	249	985	141	315800	353	1315
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	6090	●1150	1½	120.5	388800	405	1620	133.5	466760	499	1940	157	595010	686	2475
		4575	860	¾	127	316800	330	1320	140	379990	406	1575	166.5	484340	558	2020
		3780	* 710	½	129	274320	286	1140	144.5	329610	352	1370	172	419240	483	1745
	3 Rows	6120	●1150	1½	107.5	310320	323	1290	117	372990	398	1550	135.5	475230	548	1980
		4590	860	¾	112	252720	263	1055	123.5	303020	323	1255	143	386700	446	1615
		3795	* 710	½	115.5	222480	232	925	127	267330	285	1105	148.5	340470	392	1420
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
50°F.	4 Rows	6090	●1150	1½	109	384850	397	1605	118	439110	461	1830	141.5	575960	644	2400
		4575	860	¾	114.5	312830	323	1305	124.5	357000	375	1490	150.5	467340	523	1945
		3780	* 710	½	117.5	271360	280	1130	128	309880	326	1290	156	405650	454	1690
	3 Rows	6120	●1150	1½	96.5	308460	318	1285	103.5	352000	370	1465	122	461980	517	1925
		4590	860	¾	101	250990	259	1045	108.5	286310	301	1195	129	375480	420	1565
		3795	* 710	½	104	220430	227	920	112	251330	264	1045	133.5	329210	368	1375
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	6090	●1150	1½	114	414720	432	1725	127	491230	527	2050	150	619760	714	2580
		4575	860	¾	119.5	336960	351	1405	134	398860	428	1660	160	503870	581	2100
		3780	* 710	½	123	292320	305	1220	138	346380	371	1445	165.5	536820	503	1820
	3 Rows	6120	●1150	1½	100.5	332640	347	1385	110.5	393960	422	1645	128.5	496710	572	2070
		4590	860	¾	105	270720	282	1130	116	320480	344	1335	135.5	404270	466	1685
		3795	* 710	½	108.5	237600	248	990	120	281300	302	1170	141	354800	409	1480

No. 600 Massachusetts Types "V" and "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
30°F.	4 Rows	6090	●1150	1½	95	437960	452	1825	103.5	489090	514	2040	126	626250	701	2610
		4575	860	¾	101	357200	368	1490	110.5	399840	420	1665	136.5	510250	571	2125
		3780	* 710	½	104.5	309000	319	1290	114	344150	362	1435	141.5	440520	493	1840
	3 Rows	6120	●1150	1½	81.5	352840	364	1470	88	394130	414	1645	106.5	504890	565	2105
		4590	860	¾	86.5	287360	296	1195	93.5	321300	338	1340	113.5	410350	459	1710
		3795	* 710	½	89.5	250990	259	1045	97	279890	294	1165	118	358050	401	1495
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	6090	●1150	1½	100	468000	488	1950	112.5	544400	584	2265	134	665330	767	2770
		4575	860	¾	106	381600	398	1590	120.5	444350	476	1855	145	542930	626	2260
		3780	* 710	½	110	329040	343	1370	124.5	383460	411	1600	150.5	468720	540	1950
	3 Rows	6120	●1150	1½	85.5	377280	393	1570	95	438740	470	1830	112	536420	618	2235
		4590	860	¾	90.5	306720	320	1280	101	356870	383	1490	119.5	436170	503	1820
		3795	* 710	½	92.5	267840	279	1140	105.5	311390	334	1300	124.5	381590	439	1585
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
0°F.	4 Rows	6090	●1150	1½	74	520160	536	2170	80.5	560490	589	2335	102	686600	768	2860
		4575	860	¾	81	424130	437	1770	88.5	456960	480	1900	111.5	559190	626	2330
		3780	* 710	½	84	367380	379	1530	92.5	395550	416	1650	117.5	484770	542	2020
	3 Rows	6120	●1150	1½	59	421950	435	1755	63.5	454100	477	1890	81.5	556500	623	2320
		4590	860	¾	63	342650	353	1430	70.5	369140	388	1540	88	452590	506	1885
		3795	* 710	½	67.5	298280	308	1240	74	321300	338	1340	92.5	392910	440	1635
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	6090	●1150	1½	77.5	545760	569	2275	88	608780	653	2535	107.5	717410	827	2985
		4575	860	¾	86	593280	464	1855	97	496820	533	2070	118	585900	675	2440
		3780	* 710	½	90	385200	401	1605	102	430350	461	1795	125.5	513640	592	2140
	3 Rows	6120	●1150	1½	63	442800	461	1845	70	494030	530	2055	85.5	582650	671	2430
		4590	860	¾	67	360000	375	1500	77	402360	431	1675	93	473930	546	1975
		3795	* 710	½	72	313200	326	1305	81	349880	375	1460	97.5	412080	475	1715

1. C. F. M.—The cubic feet of air per minute ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 1150 and 860 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, Direct Current or single phase, 2 phase, or 3 phase Alternating Current.

●The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160°F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32°F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

No. 800 MASSACHUSETTS TYPES "V" and "C" UNIT HEATERS

FLOOR AND CEILING MODELS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.
	Number of tubes deep				**0 lbs. Steam Pressure—212°F**				**10 lbs. Steam Pressure—240°F**				**75 lbs. Steam Pressure—320°F**			
70°F.	**4 Rows**	8120	●1150	2	122	443470	457	1845	132	518840	545	2160	156	701790	785	2925
		6100	860	1	126.5	359050	370	1500	137	419830	441	1745	163.5	567690	635	2645
		5040	* 710	½	129.5	312470	322	1300	140	364610	383	1520	168.5	493490	552	2055
	3 Rows	8160	●1150	2	111	451280	462	1465	118.5	411260	432	1715	137	556070	622	2320
		6120	860	1	115	288100	297	1200	123	436100	353	1400	143	454500	508	1895
		5060	* 710	½	118	254240	262	1060	127	300000	314	1250	149	402300	450	1675
					5 lbs. Steam Pressure—227°F				**25 lbs. Steam Pressure—267°F**				**125 lbs. Steam Pressure—353°F**			
	4 Rows	8120	●1150	2	127	484800	505	2020	141	587790	630	2445	164	759500	875	3160
		6100	860	1	132.5	391680	408	1630	146.5	474890	509	1975	172	612800	706	2555
		5040	* 710	½	135.5	340800	355	1420	150.5	412390	442	1720	177.5	533820	615	2220
	3 Rows	8160	●1150	2	115	384000	400	1600	125	465570	499	1935	143	601520	693	2505
		6120	860	1	119.5	314000	327	1310	130.5	381000	407	1590	150	490000	565	2040
		5060	* 710	½	122.5	277440	289	1155	134.5	335880	360	1400	156	434000	500	1805
					0 lbs. Steam Pressure—212°F				**10 lbs. Steam Pressure—240°F**				**75 lbs. Steam Pressure—320°F**			
60°F.	**4 Rows**	8120	●1150	2	115.5	478210	493	1990	125	552160	580	2300	149	736660	824	3070
		6100	860	1	120.5	388970	401	1620	131	450300	473	1875	157.5	599870	671	2500
		5040	* 710	½	123.5	337560	348	1405	134	390320	410	1625	162.5	519410	581	2160
	3 Rows	8160	●1150	2	104	382180	394	1595	111	440780	463	1840	129.5	589150	659	2450
		6120	860	1	107.5	310400	320	1295	115.5	358900	377	1495	136	478290	535	1990
		5060	* 710	½	110.5	273540	282	1140	119.5	316060	332	1315	141	421070	471	1755
					5 lbs. Steam Pressure—227°F				**25 lbs. Steam Pressure—267°F**				**125 lbs. Steam Pressure—353°F**			
	4 Rows	8120	●1150	2	120.5	518400	540	2160	133.5	620450	665	2585	157	793350	914	3300
		6100	860	1	127	422400	440	1760	140	504750	541	2100	166.5	645790	744	2690
		5040	* 710	½	129	365760	381	1520	144.5	437580	469	1825	172	558990	644	2325
	3 Rows	8160	●1150	2	107.5	413760	431	1720	117	495420	531	2065	135.5	633640	730	2640
		6120	860	1	112	336960	351	1405	123.5	402120	431	1675	143	515590	594	2150
		5060	* 710	½	115.5	296640	309	1235	127	354540	380	1475	148.5	453960	523	1890
					0 lbs. Steam Pressure—212°F				**10 lbs. Steam Pressure—240°F**				**75 lbs. Steam Pressure—320°F**			
50°F.	**4 Rows**	8120	●1150	2	109	513140	529	2140	118	585480	615	2440	141.5	767950	859	3200
		6100	860	1	114.5	417100	430	1740	124.5	476000	500	1985	150.5	623120	697	2595
		5040	* 710	½	117.5	361810	373	1505	128	413170	434	1720	156	540870	605	2255
	3 Rows	8160	●1150	2	96.5	411280	424	1715	103.5	469340	493	1955	122	615970	689	2565
		6120	860	1	101	334650	345	1395	108.5	381750	401	1590	129	500640	560	2085
		5060	* 710	½	104	293910	303	1225	112	335100	352	1395	133.5	438950	491	1830
					5 lbs. Steam Pressure—227°F				**25 lbs. Steam Pressure—267°F**				**125 lbs. Steam Pressure—353°F**			
	4 Rows	8120	●1150	2	114	552960	576	2300	127	654970	702	2730	150	826340	952	3440
		6100	860	1	119.5	449280	468	1870	134	531810	570	2215	160	671830	774	2800
		5040	* 710	½	123	389760	406	1625	148	461840	495	1925	165.5	582430	671	2425
	3 Rows	8160	●1150	2	100.5	443520	462	1845	110.5	525280	563	2190	128.5	662280	763	2760
		6120	860	1	105	360960	376	1505	116	427310	458	1780	135.5	539030	621	2245
		5060	* 710	½	108.5	316800	330	1320	120	375070	402	1560	141	473060	545	1970

No. 800 Massachusetts Types "V" and "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
	Number of tubes deep				0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
30°F.	4 Rows	8120	●1150	2	95	583940	602	2430	103.5	652120	685	2720	126.5	835000	934	3480
		6100	860	1	101	476270	491	1985	110.5	533120	560	2220	136.5	680330	761	2835
		5040	* 710	½	104.5	412000	425	1720	114	458860	482	1910	141.5	587360	657	2450
	3 Rows	8160	●1150	2	81.5	470450	485	1960	88	525500	552	2190	106.5	673180	753	2805
		6120	860	1	86.5	384150	395	1595	93.5	428400	450	1785	113.5	547130	612	2280
		5060	* 710	½	89.5	334650	345	1395	97	373180	392	1555	118	477400	534	1990
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	8120	●1150	2	100	624000	650	2600	112.5	725870	778	3020	134	887100	1022	3695
		6100	860	1	106	508800	530	2120	120.5	592460	635	2470	145	723910	834	3010
		5040	* 710	½	110	438720	457	1825	114.5	511280	548	2130	150.5	624960	720	2600
	3 Rows	8160	●1150	2	85.5	503040	524	2095	95	584990	627	2440	112	715230	824	2980
		6120	860	1	90.5	408960	426	1705	101	475830	510	1985	119.5	581560	670	2425
		5060	* 710	½	92.5	357120	372	1485	105.5	415180	445	1730	124.5	507780	585	2115
					0 lbs. Steam Pressure—212°F				10 lbs. Steam Pressure—240°F				75 lbs. Steam Pressure—320°F			
0°F.	4 Rows	8120	●1150	2	74	693550	715	2890	80.5	747320	785	3110	102	915460	1024	3815
		6100	860	1	81	565510	583	2360	88.5	609280	640	2535	111.5	745590	834	3105
		5040	* 710	½	84	489850	505	2040	92.5	527400	554	2200	117.5	646360	723	2690
	3 Rows	8160	●1150	2	59	562600	580	2340	63.5	605470	636	2520	81.5	742000	830	3090
		6120	860	1	63	456870	471	1905	70.5	492180	517	2050	88	603450	675	2510
		5060	* 710	½	67.5	397700	410	1655	74	428400	450	1785	92.5	523880	586	2180
					5 lbs. Steam Pressure—227°F				25 lbs. Steam Pressure—267°F				125 lbs. Steam Pressure—353°F			
	4 Rows	8120	●1150	2	77.5	727680	758	3030	88	811710	870	3380	107.5	956540	1102	3980
		6100	860	1	86	593280	618	2470	97	662430	710	2760	118	781200	900	3255
		5040	* 710	½	90	513600	535	2140	102	573800	615	2390	125.5	684850	789	2855
	3 Rows	8160	●1150	2	63	490400	615	2460	70	658700	706	2740	85.5	776860	895	3240
		6120	860	1	67	480000	500	2000	77	536480	575	2235	93	631900	728	2635
		5060	* 710	½	72	417600	435	1740	81	466500	500	1945	97.5	549440	633	2285

1. C. F. M.—The cubic feet of air per minute ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 1150 and 860 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, Direct Current or single phase, 2 phase, or 3 phase Alternating Current.

●The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

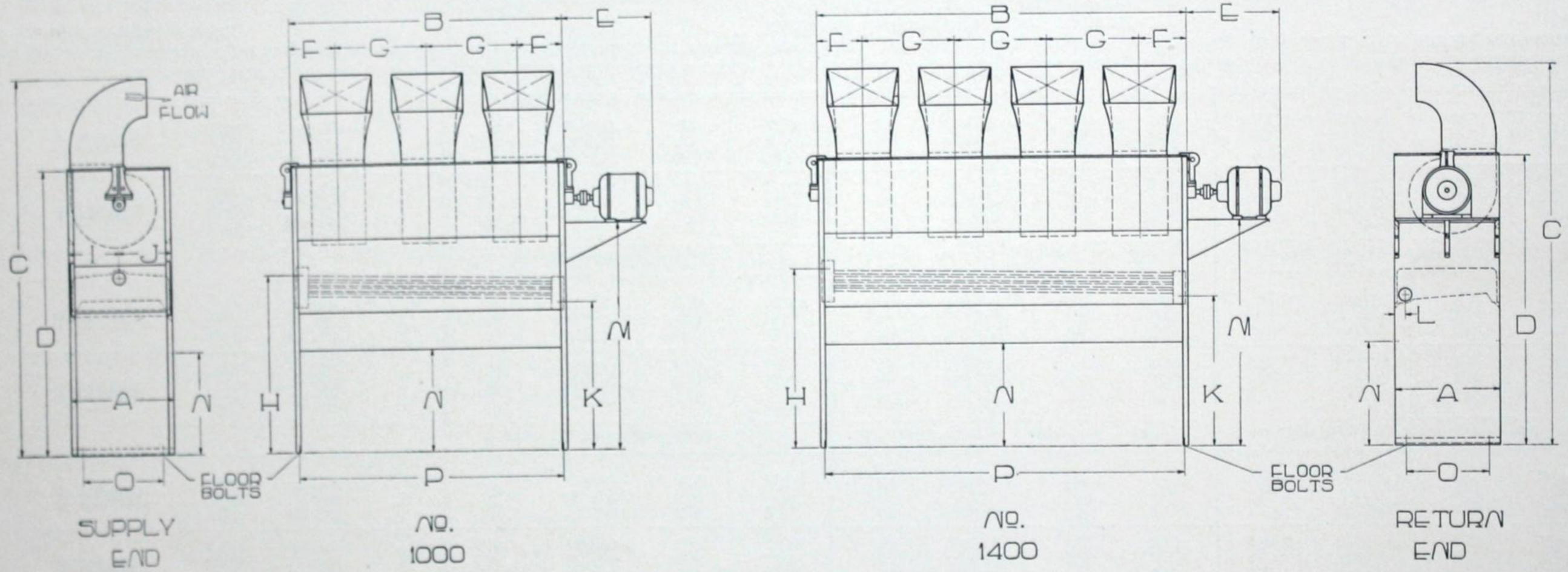
3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160°F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32°F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

Dimensions
Massachusetts Type "V" Unit Heater
30-inch Model
FOR FLOOR MOUNTING



Unit No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Size of Tappings		Floor Space Sq. Ft.	Size Outlet Cowl	Total Ship'g Weight
																	Steam	Drip			
1000	30 3/8	80 1/2	111	84	26 1/16	13 3/8	26 3/4	52 1/4	14 5/8	15 3/8	43 1/2	2 3/4	66 1/16	30	24	77 1/2	3	3	14.0	11x20 1/2	1780
1400	30 3/8	107 1/2	111	84	27 3/16	13 13/32	26 13/16	52 1/4	14 5/8	15 3/8	43 1/2	2 3/4	65 11/16	30	24	104 3/4	3	3	22.7	11x20 1/2	2000

Heating Sections:

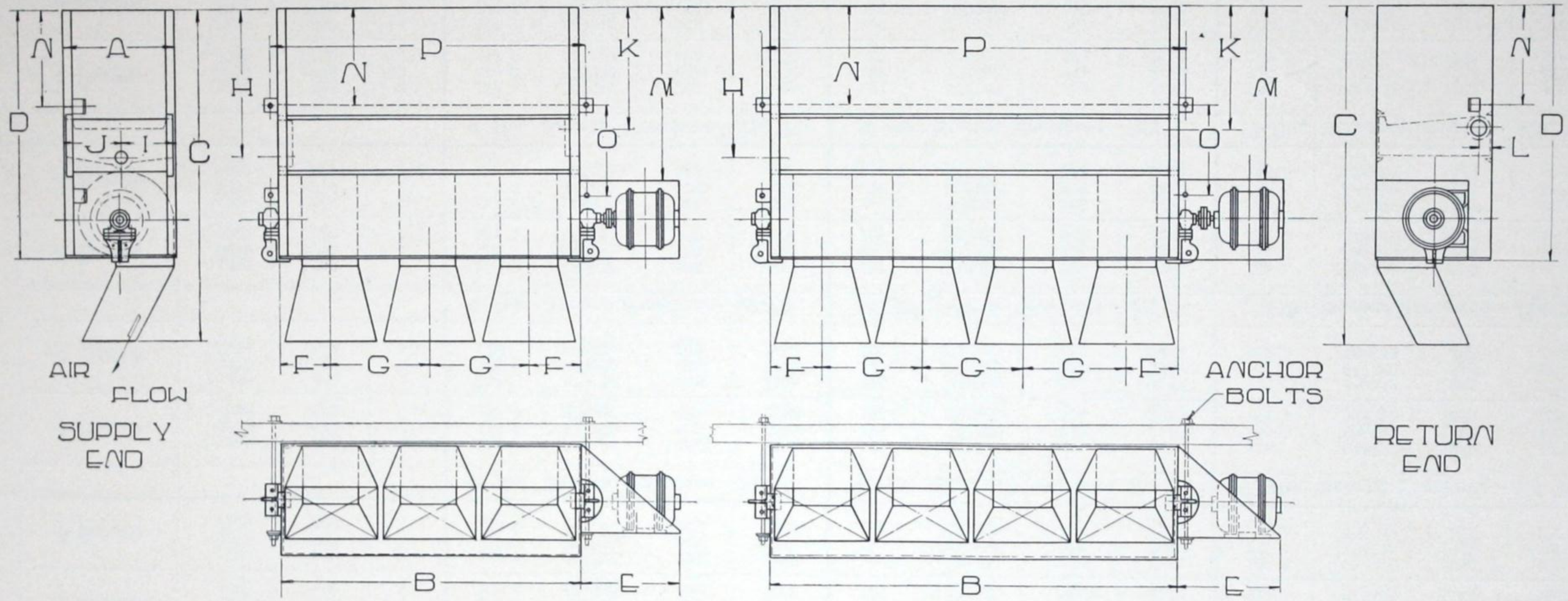
	3 Row	4 Row
No. 1000	280 Lineal feet Tubing	378 Lineal feet Tubing
No. 1400	384 Lineal feet Tubing	518 Lineal feet Tubing

Fan Wheels:

No. 1000	3-12½" diameter S. C. Fans
No. 1400	4-12½" diameter S. C. Fans

Dimensions
Massachusetts Type "C" Unit Heater
30-inch Model

FOR CEILING SUSPENSION



Unit No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Size of Tappings		Ceiling Space Sq. Ft.	Size Outlet Cowl	Total Ship'g Weight
																	Steam	Drip			
1000	30	80½	94½	72	26 1/16	13 3/8	26 3/4	41 5/8	14 5/8	15 3/8	34 5/8	2 3/4	51	30	20	84½	3	3	53	14½x25	1730
1400	30	107½	94½	72	27 3/16	13 13/32	26 13/16	41 5/8	14 5/8	15 3/8	34 5/8	2 3/4	51	30	20	111½	3	3	70	14½x25	1950

Heating Sections:

	3 Row	4 Row
No. 1000	280 Lineal feet Tubing	378 Lineal feet Tubing
No. 1400	384 Lineal feet Tubing	518 Lineal feet Tubing

Fan Wheels:

No. 1000	3-12½" diameter S. C. Fans
No. 1400	4-12½" diameter S. C. Fans

No. 1000 MASSACHUSETTS TYPE "V" & "C" UNIT HEATERS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.
70 °F.	Number of tubes deep				0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	11200	860	3	126.5	659600	680	2740	137	771120	810	3210	162.5	1043300	1167	4350
		9250	*710	2	130	578120	596	2410	142	686390	721	2860	169.5	914560	1023	3805
		9000	690	1½	131	572300	590	2385	143	667350	701	2780	170.5	902940	1010	3760
	3 Rows	11230	860	3	115	533500	550	2220	123	623560	655	2595	143.5	843040	943	3510
		9270	*710	2	118	465600	480	1940	126.5	543590	571	2260	148	734870	822	3055
		9020	690	1½	119	460750	475	1920	127.5	537880	565	2240	149	726820	813	3030
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	11200	860	3	132	720000	750	3000	146	871420	934	3630	171	1128400	1300	4700
		9250	*710	2	136.5	631680	658	2630	151	764130	819	3180	178.5	988650	1139	4115
		9000	690	1½	139.5	624000	650	2600	152	754800	809	3140	179.5	976500	1125	4060
	3 Rows	11230	860	3	119.5	581760	606	2420	130.5	704420	755	2930	150.5	911400	1050	3795
		9270	*710	2	122.5	507840	529	2115	134.5	614850	659	2555	155.5	794220	915	3305
		9020	690	1½	123.5	502080	523	2090	135.5	607380	651	2530	156.5	785540	905	3270
60 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	11200	860	3	120	712950	735	2970	130	823480	865	3430	156	1098730	1229	4565
		9250	*710	2	124.5	627590	647	2615	135	724470	761	3015	163.5	965520	1080	4015
		9000	690	1½	125.5	619830	639	2580	136	716860	753	2985	164.5	955690	1069	3980
	3 Rows	11230	860	3	108	578120	596	2405	116	668300	702	2780	136	889530	995	3700
		9270	*710	2	111	504400	520	2100	119.5	583580	613	2430	141.5	777780	870	3240
		9020	690	1½	112	499550	515	2080	120.5	576910	606	2405	142.5	768840	860	3200
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	11200	860	3	125.5	772800	805	3215	139	923670	990	3845	165	1182220	1362	4915
		9250	*710	2	130	680640	709	2835	145	812640	871	3385	173.5	1041600	1200	4350
		9000	690	1½	131	672000	700	2800	146	802380	860	3340	174.5	1027710	1184	4275
	3 Rows	11230	860	3	112.5	626880	653	2610	123.5	749200	803	3120	144.5	958270	1104	3990
		9270	*710	2	115.5	547200	570	2280	127.5	653100	700	2720	148.5	837620	965	3490
		9020	690	1½	116.5	541440	564	2260	128.5	646570	693	2695	149.5	828070	954	3450
50 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	11200	860	3	114	768240	792	3205	124	876790	921	3650	150	1154150	1291	4805
		9250	*710	2	118.5	676090	697	2820	129.5	772070	811	3215	158	1016480	1137	4235
		9000	690	1½	119.5	664450	685	2770	130.5	759700	798	3160	159	999490	1118	4160
	3 Rows	11230	860	3	101	622740	642	2595	108	711140	747	2965	129.5	936910	1048	3900
		9270	*710	2	104.5	544170	561	2265	113.5	620700	652	2585	135	817120	914	3400
		9020	690	1½	105.5	538350	555	2240	114.5	614990	646	2560	136	809070	905	3370
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	11200	860	3	119.5	829440	864	3450	133	980580	1051	4080	159	1241240	1430	5170
		9250	*710	2	124.5	729600	760	3035	139	863030	925	3595	167.5	1092810	1259	4550
		9000	690	1½	125.5	717120	747	2990	140	849030	910	3535	168.5	1073720	1237	4470
	3 Rows	11230	860	3	105.5	672000	700	2800	116.5	794920	852	3315	135.5	1006010	1159	4195
		9270	*710	2	109	586560	611	2445	120.5	694150	744	2890	140.5	877550	1011	3655
		9020	690	1½	110	580800	605	2420	121.5	686690	736	2865	141.5	868000	1000	3615

No. 1000 Massachusetts Type "V" & "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
30 °F.	Number of tubes deep				0 lbs. Steam Pressure—212°F.				10 lbs. Steam Pressure—240°F.				75 lbs. Steam Pressure—320°F.			
	4 Rows	11200	860	3	101	881730	909	3675	110	983420	1033	4100	136	1260540	1410	5250
		9250	*710	2	106	774060	798	3220	116	862510	906	3595	144	1105880	1237	4600
		9000	690	1½	107	758540	782	3155	117	846330	889	3525	145	1082630	1211	4505
	3 Rows	11230	860	3	87	713920	736	2970	94	796820	837	3320	113.5	1019160	1140	4245
		9270	*710	2	90.5	624680	644	2600	97.5	696860	732	2900	119.5	891320	997	3710
		9020	690	1½	91.5	616920	636	2570	98.5	689250	724	2870	120.5	881480	986	3670
					5 lbs. Steam Pressure—227°F.				25 lbs. Steam Pressure—267°F.				125 lbs. Steam Pressure—353°F.			
	4 Rows	11200	860	3	106	940800	980	3920	119.5	1088810	1167	4530	144	1338460	1542	5570
		9250	*710	2	112	825600	860	3440	126.5	954460	1023	3975	153	1175270	1354	4900
		9000	690	1½	113	809280	843	3370	127.5	934870	1002	3890	154	1151840	1327	4800
	3 Rows	11230	860	3	91	761280	793	3170	101.5	880750	944	3670	120	1084130	1249	4515
		9270	*710	2	95	666240	694	2775	106	769730	825	3200	126	947860	1092	3950
		9020	690	1½	96	658560	686	2740	107	761330	816	3170	127	937440	1080	3905
0 °F.					0 lbs. Steam Pressure—212°F.				10 lbs. Steam Pressure—240°F.				75 lbs. Steam Pressure—320°F.			
	4 Rows	11200	860	3	82	1051480	1084	4385	88.5	1132880	1190	4725	112	1387490	1552	5775
		9250	*710	2	87.5	925380	954	3850	95.5	997700	1048	4150	120.5	1222100	1367	5100
		9000	690	1½	88.5	905980	934	3775	96.5	974850	1024	4055	121.5	1196170	1338	4985
	3 Rows	11230	860	3	65	853600	880	3550	70.5	918680	965	3825	88.5	1126440	1260	4695
		9270	*710	2	69.5	747870	771	3115	76	806340	847	3360	94.5	986080	1103	4105
		9020	690	1½	70.5	741080	764	3085	77	798730	839	3325	95.5	977140	1093	4045
					5 lbs. Steam Pressure—227°F.				25 lbs. Steam Pressure—267°F.				125 lbs. Steam Pressure—353°F.			
	4 Rows	11200	860	3	86.5	1104000	1150	4600	98	1235290	1324	5150	118.5	1449560	1670	6040
		9250	*710	2	92.5	970560	1011	4045	105.5	1086950	1165	4525	127.5	1275960	1470	5310
		9000	690	1½	93.5	950400	990	3960	106.5	1063620	1140	4440	128.5	1249920	1440	5200
	3 Rows	11230	860	3	68	895680	933	3730	78	1000180	1072	4175	93.5	1178740	1358	4900
		9270	*710	2	73	785280	818	3270	83	877950	941	3655	100	1032920	1190	4300
		9020	690	1½	74	777600	810	3240	84	859560	932	3575	101	1023370	1179	4260

1. C. F. M.—The cubic feet of air per minure ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 860 and 690 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, direct current or single phase, 2 phase, or 3 phase alternating current.

3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160° F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32° F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

No. 1400 MASSACHUSETTS TYPE "V" & "C" UNIT HEATERS

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
70 °F.	Number of tubes deep				0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	127 131 131.5	881730 784730 761450	909 809 785	3670 3270 3170	137 142 143	1028160 915820 890120	1080 962 935	4285 3815 3705	162.5 169.5 170.5	1392850 1221200 1206010	1558 1366 1349	5800 5080 5010
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	115.5 118.5 119	711980 621770 614010	734 641 633	2970 2595 2560	123 126.5 127.5	831100 725420 717810	873 762 754	3460 3015 2985	143.5 148 149	1124650 981610 969990	1258 1098 1085	4685 4065 4040
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	132 137.5 138	960000 855360 830400	1000 891 865	4000 3565 3460	146 151 152	1162520 1017910 1006710	1246 1091 1079	4845 4245 4190	171 178.5 179.5	1504240 1318490 1302000	1733 1519 1500	6260 5495 5410
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	120 122.5 123	775680 676800 670080	808 705 698	3230 2820 2790	130.5 134 135.5	938600 820110 810780	1006 879 869	3905 3405 3375	150.5 155.5 156.5	1215200 1058960 1048540	1400 1220 1208	5055 4405 4355
60 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	120.5 125 125.5	950600 836140 825470	980 862 851	3960 2480 3440	130 135 136	1097660 966280 954860	1153 1015 1003	4575 4010 3980	156 163.5 164.5	1466160 1287360 1273950	1640 1440 1425	6100 5350 5305
	3 Rows	14940 12340 12040	850 *710 690	5 3 2	108.5 111.5 112	771150 673180 665420	795 694 686	3210 2800 2770	116 119.5 120.5	892020 777780 770170	937 817 809	3705 3240 3210	136 141.5 142.5	1188130 1037040 1025420	1329 1160 1147	4940 4315 4260
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	126 130.5 131	1029120 905280 896640	1072 943 934	4295 3770 3730	139 145 146	1232490 1083210 1071080	1321 1161 1148	5130 4510 4455	165 173.5 174.5	1578020 1388800 1371440	1818 1600 1580	6560 5800 5700
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	113 116 116.5	836160 729600 720960	871 760 751	3480 3040 3000	123.5 127.5 128.5	998310 871420 863030	1070 934 925	4160 3625 3590	144.5 148.5 149.5	1278560 1118850 1104100	1473 1289 1272	5315 4650 4600
50 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	114.5 119.5 120	1025290 902100 887550	1057 930 915	4270 3755 3700	124 129.5 130.5	1170960 1029110 1011980	1230 1081 1063	4865 4290 4210	150 158 159	1541260 1355300 1332060	1724 1516 1490	6410 5645 5550
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	102 105 105.5	830320 725560 717800	856 748 740	3460 3020 2990	108 113.5 114.5	948190 828240 819670	996 870 861	3955 3450 3415	129.5 135 136	1250710 1090680 1079060	1399 1220 1207	5200 4540 4495
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.			
	4 Rows	14900 12300 12000	860 *710 690	5 3 2	119.5 125 125.5	1104960 972480 957120	1151 1013 997	4600 4050 3990	133 139 140	1309000 1150390 1131730	1403 1233 1213	5445 4795 4720	159 167.5 168.5	1655280 1456500 1432200	1907 1678 1650	6900 6060 5965
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	106 109.5 110	895680 783360 775680	933 816 808	3730 3260 3230	116.5 120.5 121.5	1061750 925540 916210	1138 992 982	4420 3855 3820	135.5 140.5 141.5	1340190 1171800 1157040	1544 1350 1333	5595 4875 4815

No. 1400 Massachusetts Type "V" & "C" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs.perhour	Equiv. Rad. sq. ft.
30 °F.	Number of tubes deep								10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.			
	4 Rows	14900 12300 1200	860 *710 690	5 3 2	110 116 117	1312810 1150970 1128120	1379 1209 1185	5465 4795 4700	136 144 145	1680720 1475100 1445600	1880 1650 1617	7000 6140 6010				
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	94 97.5 98.5	1063380 929150 919630	1117 976 966	4430 3865 3825	113.5 119.5 120.5	1358880 1189020 1176500	1520 1330 1316	5655 4950 4900				
					25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.							
	4 Rows	14900 12300 1200	860 *710 690	5 3 2	119.5 126.5 127.5	1451750 1274480 1250220	1556 1366 1340	6045 5300 3855	144 153 154	1788080 1569340 1536360	2060 1808 1770	7435 6540 6400				
	3 Rows	14940 12340 12040	850 *710 690	5 3 2	101.5 106 107	1175580 1026300 1016040	1260 1100 1089	4895 4260 4230	120 126 127	1445220 1266410 1250790	1665 1459 1441	6025 5260 5205				
0 °F.					10 lbs. Steam Pressure—240 °F.				75 lbs. Steam Pressure—320 °F.							
	4 Rows	14900 12300 1200	860 *710 690	5 3 2	88.5 95.5 96.5	1511780 1331850 1302340	1588 1399 1368	6300 5540 5405	112 120.5 121.5	1843430 1629760 1595790	2062 1823 1785	7685 6795 6655				
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	70.5 76 77	1226180 1075760 1066240	1288 1130 1120	5100 4490 4440	88.5 94.5 95.5	1501920 1316860 1305240	1680 1473 1460	6255 5485 5445				
					25 lbs. Steam Pressure—267 °F.				125 lbs. Steam Pressure—353 °F.							
	4 Rows	14900 12300 1200	860 *710 690	5 3 2	98 105.5 106.5	1649540 1449880 1418160	1768 1554 1520	6865 6040 5920	118.5 127.5 128.5	1933040 1702150 1667430	2227 1961 1921	8055 7100 6950				
	3 Rows	14940 12340 12040	860 *710 690	5 3 2	78 83 84	1336060 1171850 1159720	1432 1256 1243	5565 4870 4760	93.5 100 101	1571950 1379250 1363630	1811 1589 1571	6550 5750 5690				

The No. 1400 Unit Heaters are not to be used on installations where the steam pressure will be less than 10 lbs. per square inch at entering air temperature

1. C. F. M.—The cubic feet of air per minure ratings in the above tables represent the total quantity of air handled by the fans and delivered thru the nozzles at the final temperatures.

2. R. P. M.—Units running at a speed of 860 and 690 revolutions per minute are powered by 60 cycle alternating current or direct current motors.

*Units running at a speed of 710 revolutions per minute are powered by 25 or 50 cycle alternating current or direct current motors.

The speeds shown represent the full load R. P. M. of commercial motors having the corresponding current characteristics as noted above. The standard motors are designed to operate on 110, 220, 440 or 550 volts, direct current or single phase, 2 phase, or 3 phase alternating current.

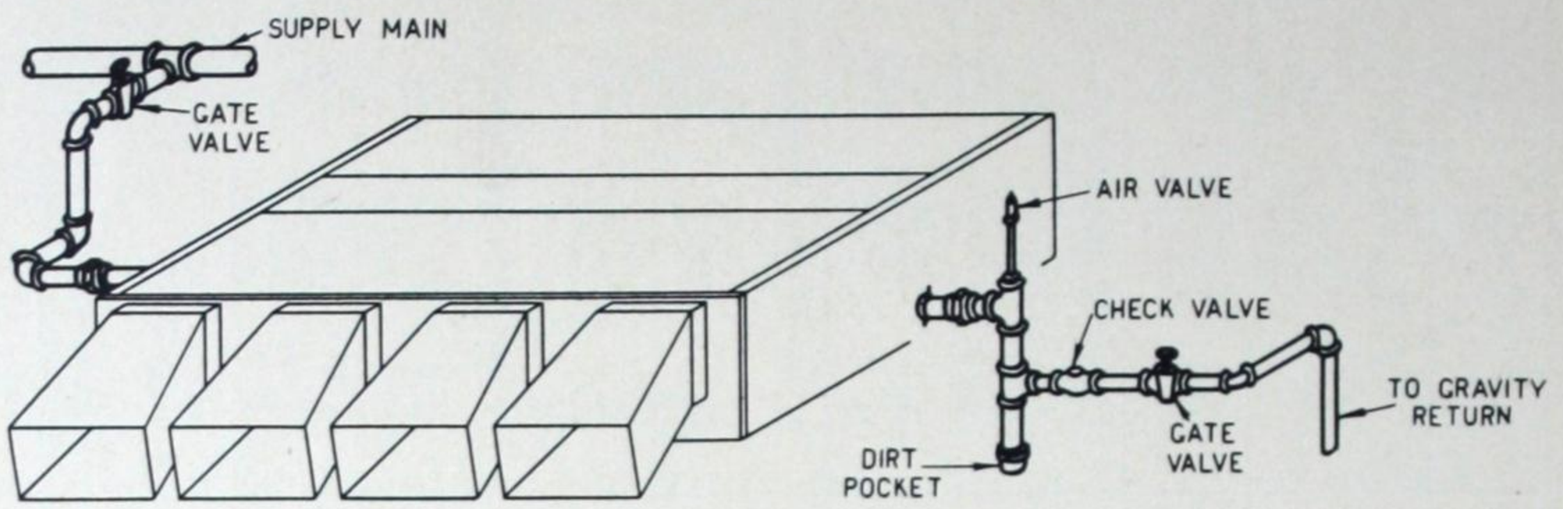
3. STEAM PRESSURE—Final temperatures, B. T. U. per hour, condensation in pounds per hour, and equivalent square feet of cast iron direct radiation, are based on dry and saturated steam being supplied to the heating element inlet at the gauge pressures shown.

4. EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column type radiation is based upon the heat emission of 240 B. T. U. per hour per square foot of direct radiation.

5. FINAL TEMPERATURE—The temperature of the air at the discharge for ordinary heating jobs, should be limited to the range between 75° and 160° F.

6. TRAPS—Unit heaters using copper fin heating elements, such as used in the above heaters, require high capacity continuous flow traps to take care of the heavy initial condensation and to provide the necessary continuous draining of the heater to prevent freezing of the tubes when the temperature of the entering air is below 32° F. The B. & B. No. 0 Blast trap is designed especially for this service, and its use on the above heaters is highly recommended.

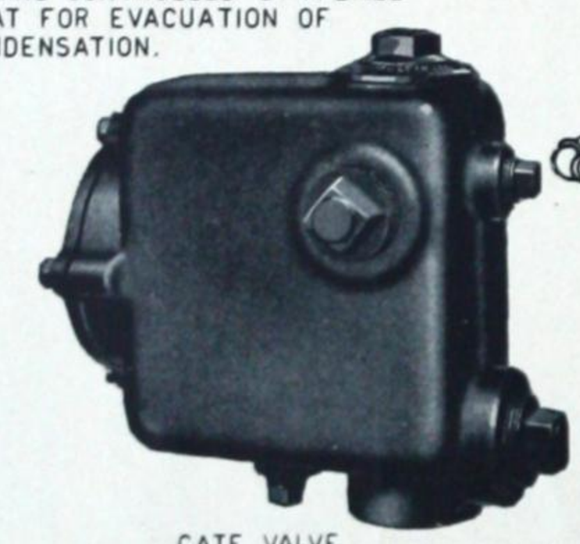
TYPICAL PIPING CONNECTIONS ON MASSACHUSETTS TYPE "V" & "C" UNIT HEATERS

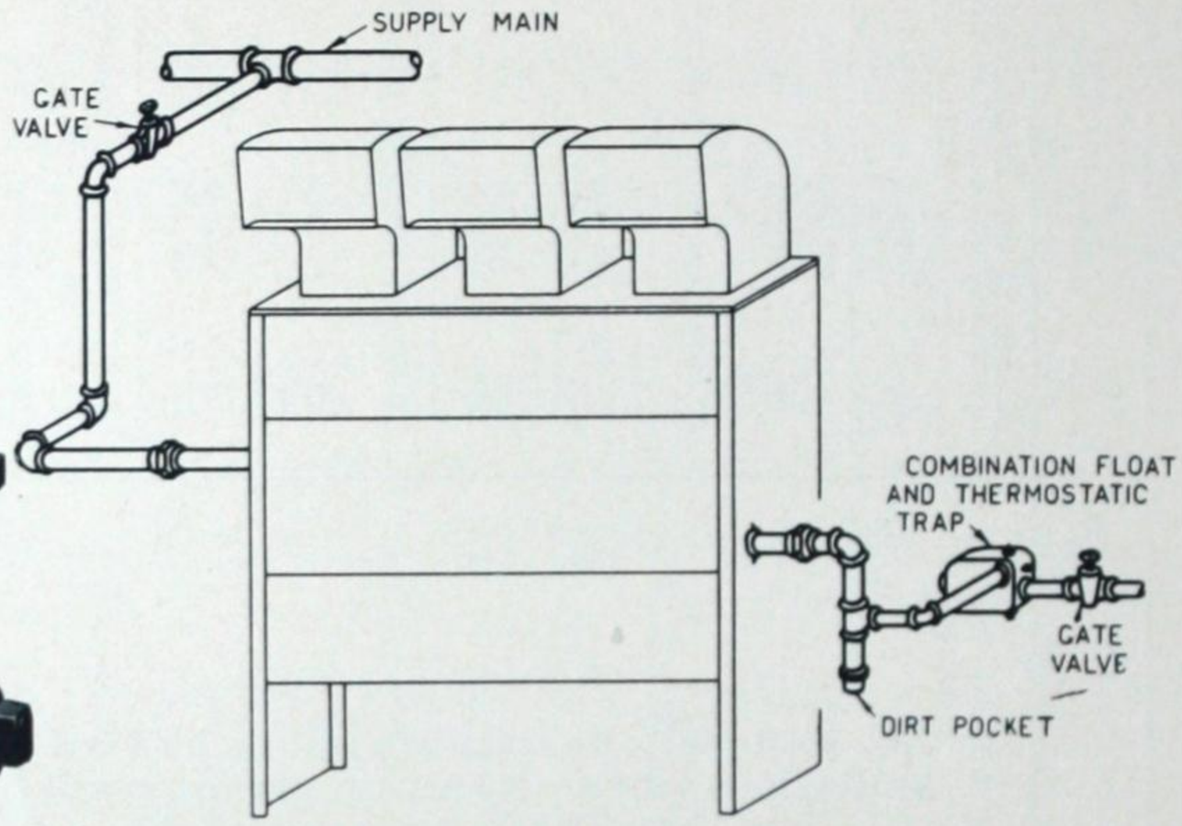


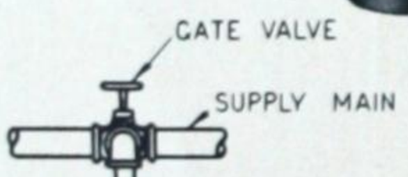
FOR LOW PRESSURE GRAVITY HEATING SYSTEM

NOTES

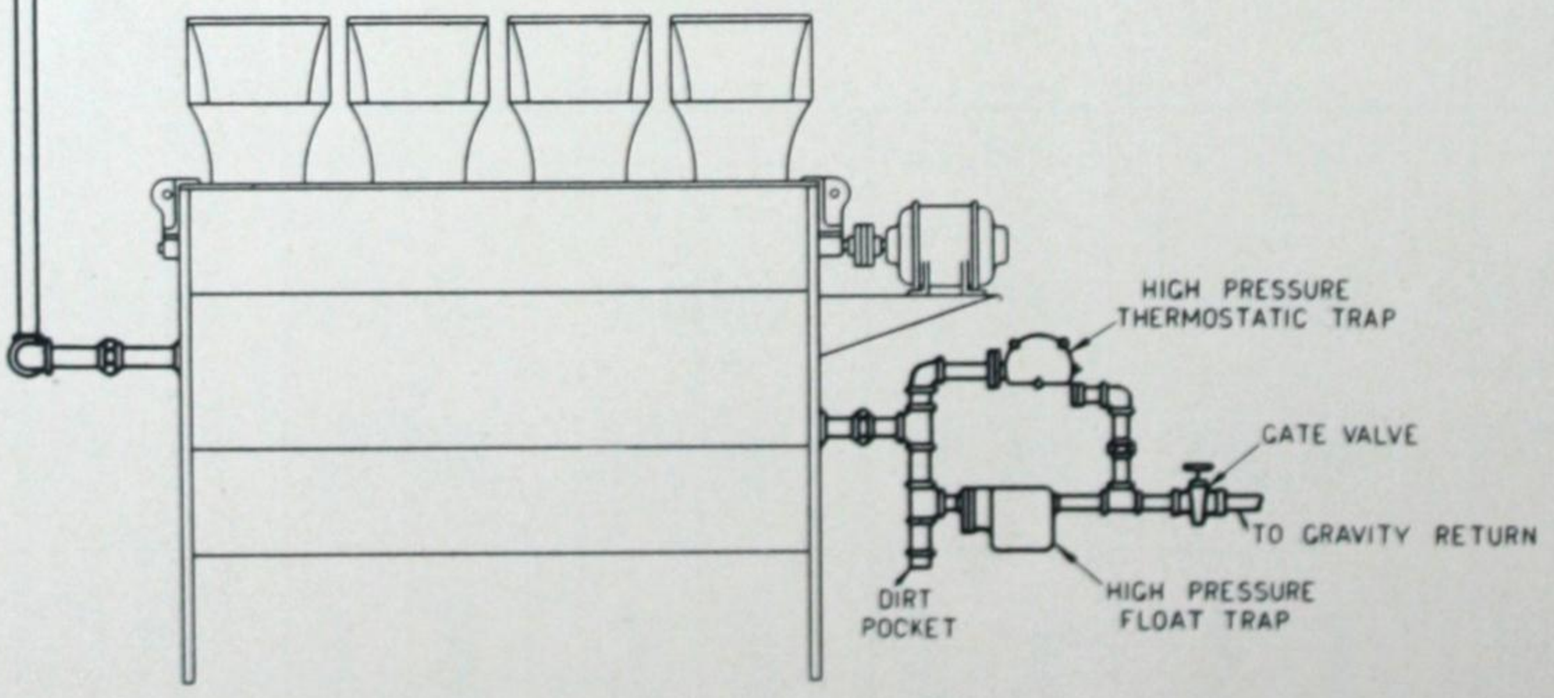
TRAPS FOR UNIT HEATERS MUST BE CAPABLE OF HANDLING VERY HIGH RATES OF INITIAL CONDENSATION AND ALLOW RAPID VENTING OF THE AIR FROM THE HEATER COILS. THE B. & B. NO. 0 BLAST TRAP, IS DESIGNED PRIMARILY FOR THIS WORK, BEING FITTED WITH A THERMOSTATIC MEMBER FOR THE RELIEF OF AIR AND A LARGE PORT OPENING CONTROLLED BY A BALL FLOAT FOR EVACUATION OF CONDENSATION.





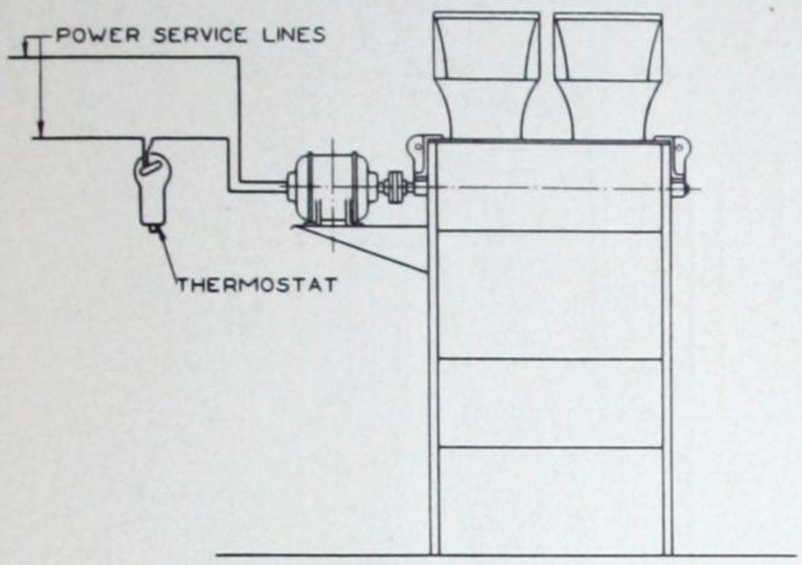


FOR LOW PRESSURE VACUUM OR VAPOR HEATING SYSTEMS

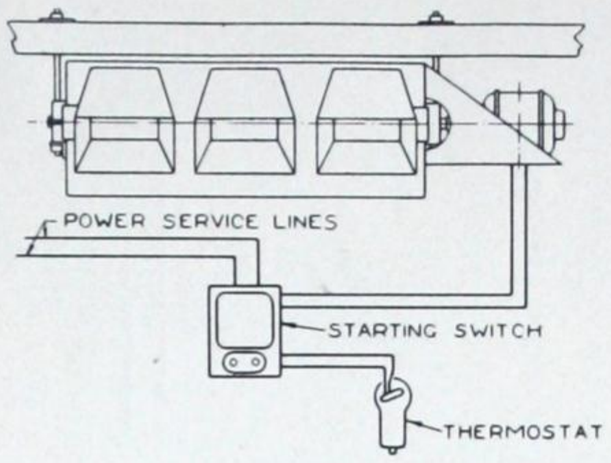


FOR HIGH PRESSURE HEATING SYSTEM

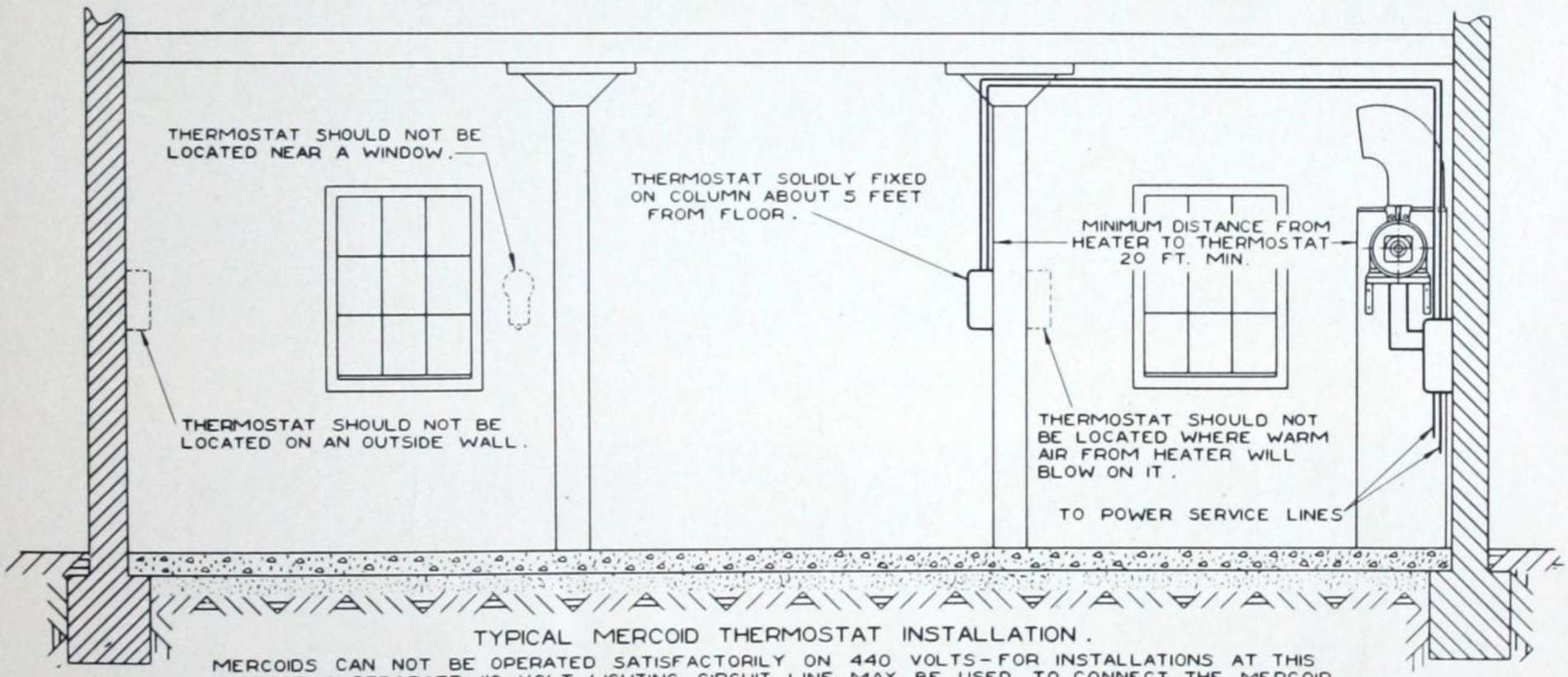
MERCOID CONTROLS USED IN CONNECTION WITH MASSACHUSETS – TYPE "V" & "C" UNIT HEATERS



WIRING DIAGRAM FOR MOTORS LESS THAN ONE HORSE-POWER. SINGLE PHASE CURRENT.

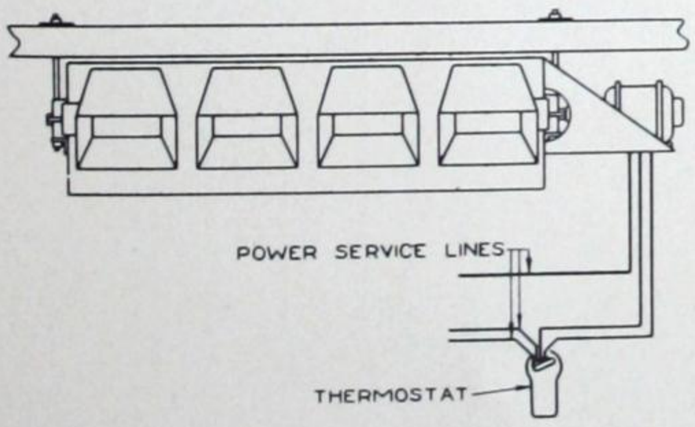


WIRING DIAGRAM FOR MOTORS OF ONE HORSE-POWER AND LARGER USING AUTOMATIC STARTING SWITCH SINGLE PHASE CURRENT.

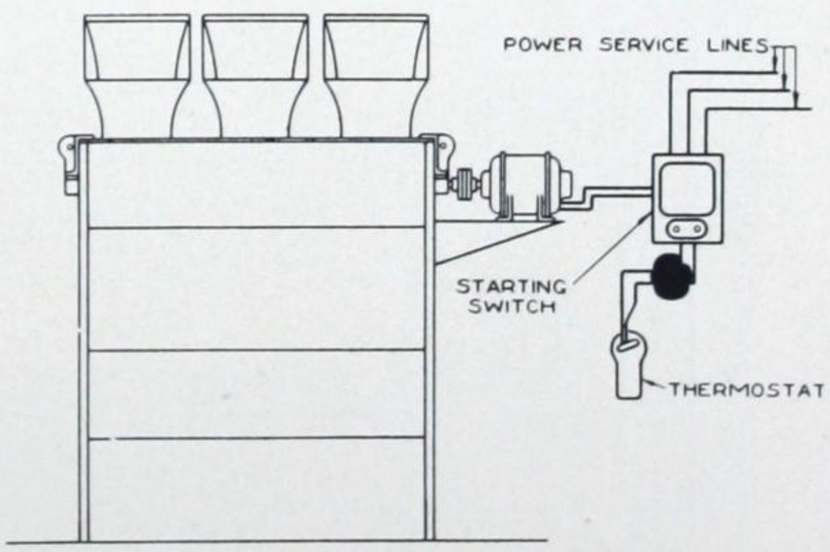


TYPICAL MERCOID THERMOSTAT INSTALLATION.

MERCOIDS CAN NOT BE OPERATED SATISFACTORILY ON 440 VOLTS – FOR INSTALLATIONS AT THIS VOLTAGE A SEPARATE 110 VOLT LIGHTING CIRCUIT LINE MAY BE USED TO CONNECT THE MERCOID AND THE STARTING SWITCH MAGNET, OR A TRANSFORMER MAY BE USED IN CONJUNCTION WITH THE STARTING SWITCH TO FURNISH 110 VOLTS FOR THE MERCOID.
AUTOMATIC ACROSS THE LINE STARTING SWITCH NOT USED WHERE LOAD IS LESS THAN 10 AMPS 110 VOLTS OR 5 AMPS 220 VOLTS.

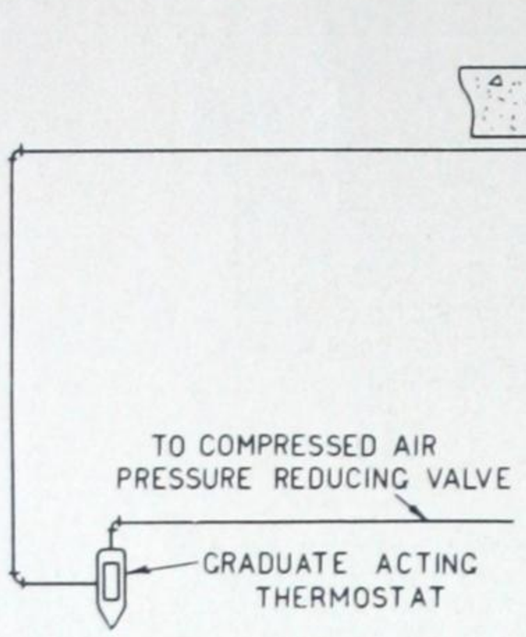


WIRING DIAGRAM FOR MOTORS LESS THAN ONE HORSE-POWER USING DOUBLE POLE THERMOSTAT ON THREE PHASE CURRENT.

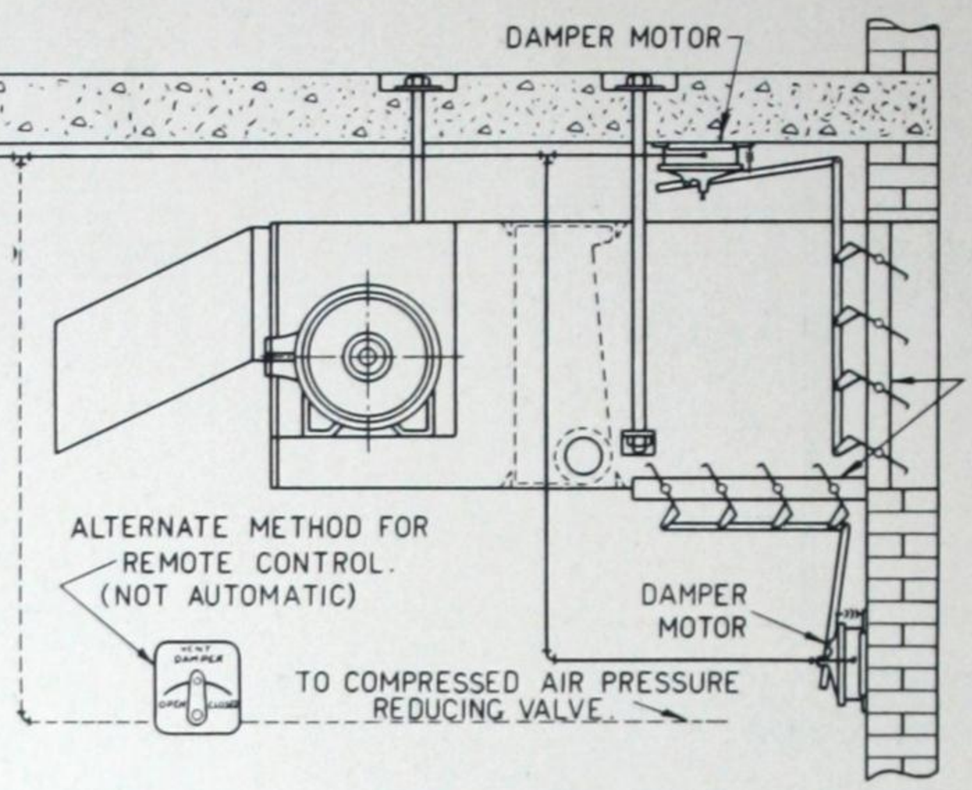


WIRING DIAGRAM FOR MOTORS OF ONE HORSE-POWER AND LARGER USING SINGLE POLE THERMOSTAT ON THREE PHASE CURRENT.

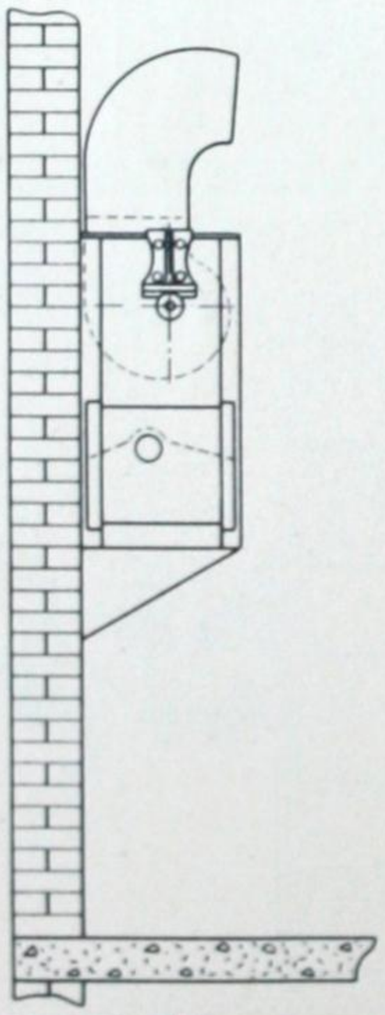
SPECIAL APPLICATIONS OF MASSACHUSETTS TYPE "V" & "C" UNIT HEATERS



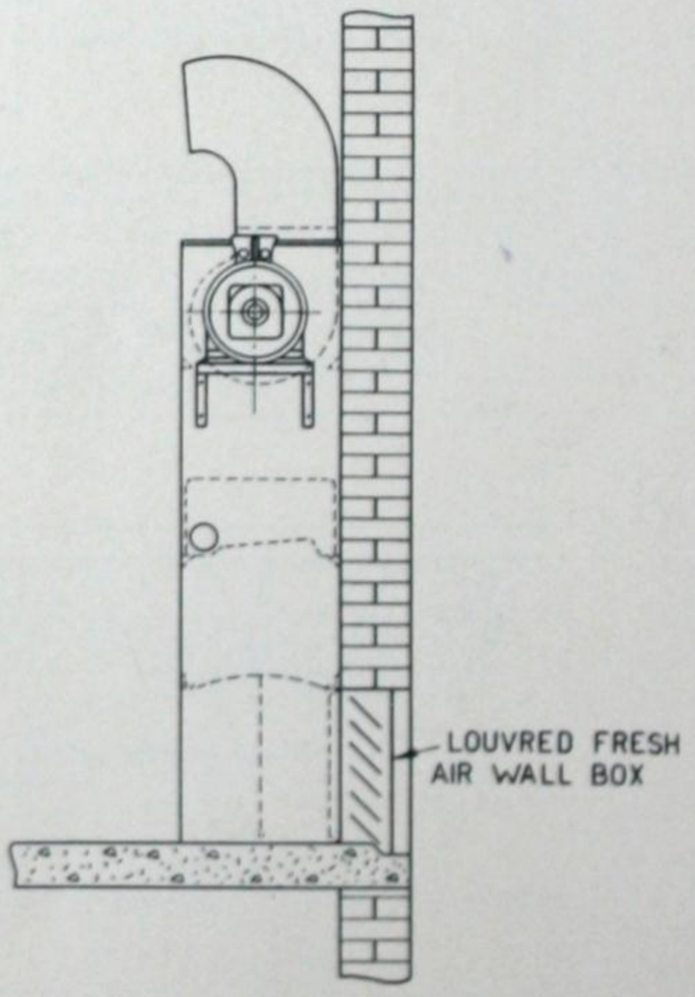
FOR AUTOMATIC THERMOSTATIC CONTROL.



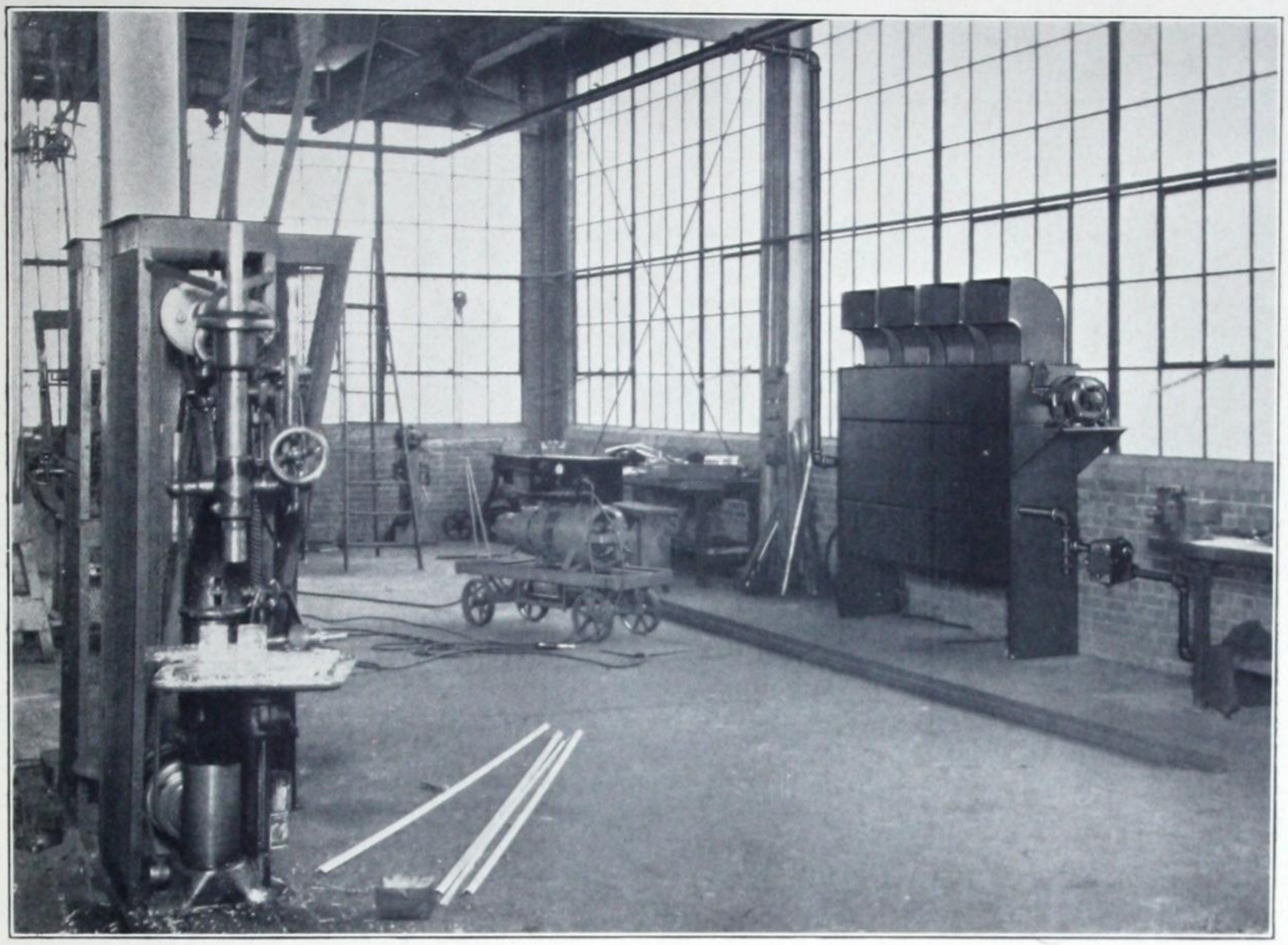
TYPE "C" UNIT HEATER WITH DAMPER CONTROLLED BY PNEUMATIC DAMPER MOTOR



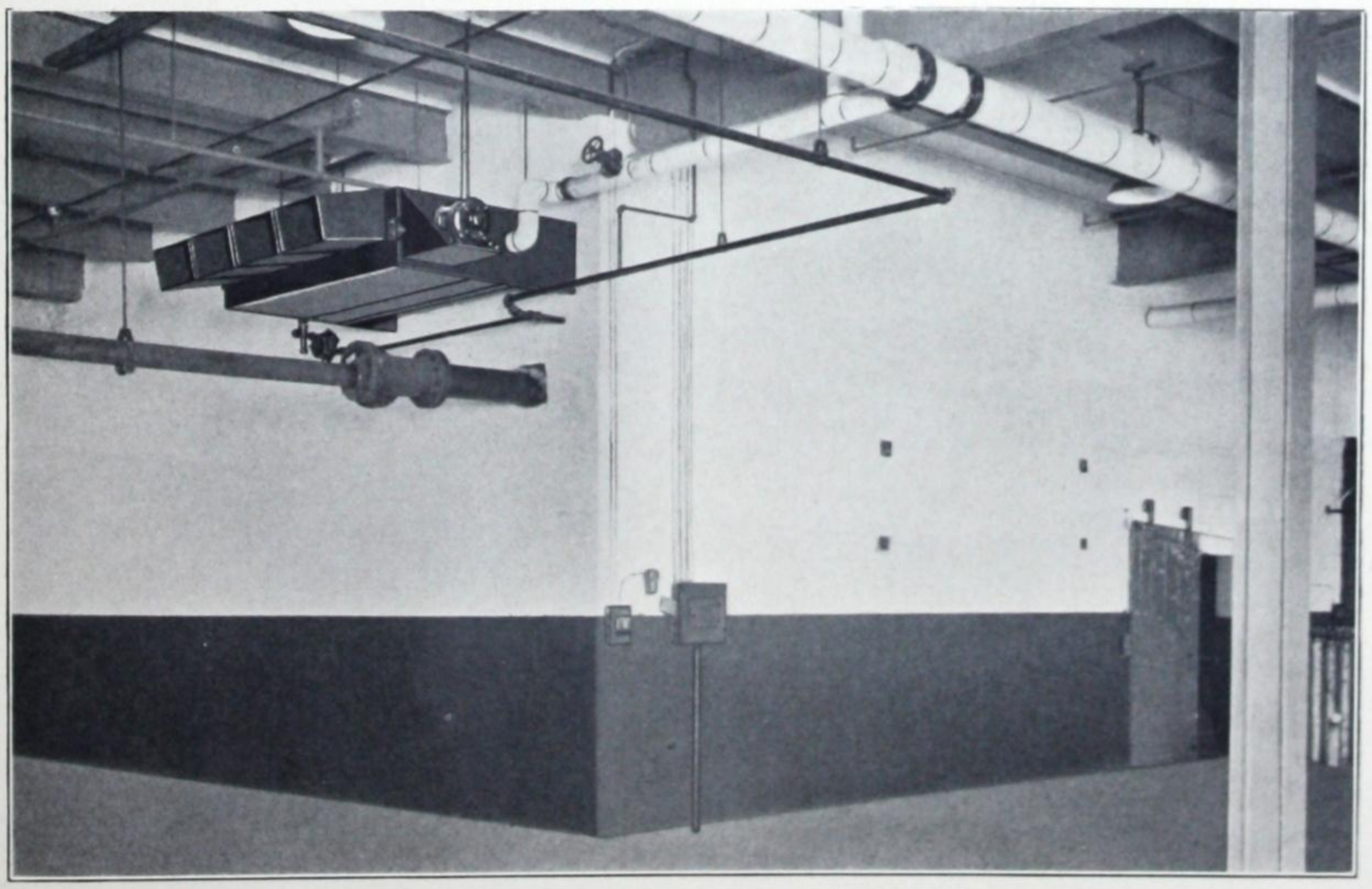
SPECIAL TYPE "V" UNIT HEATER SUPPORTED ON WALL BRACKET



TYPE "V" UNIT HEATER ARRANGED FOR PARTIAL OR TOTAL USE OF FRESH AIR OR RECIRCULATION



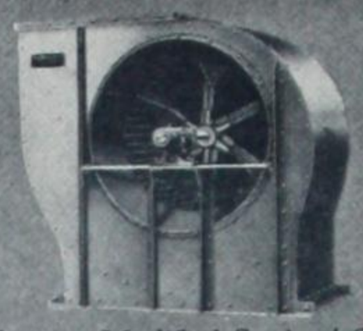
TYPICAL INSTALLATION MASSACHUSETTS TYPE "V"UNIT HEATER



TYPICAL INSTALLATION MASSACHUSETTS TYPE "C" UNIT HEATER

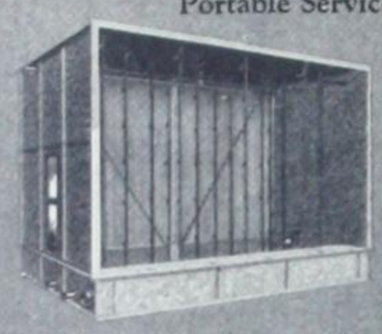
MASSACHUSETTS

Portable Service Set



Massachusetts Modified Squirrel Cage Fan

Universal Type Fan



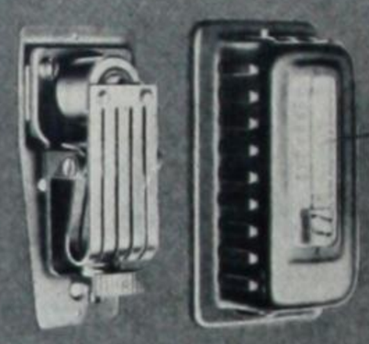
Type B Massachusetts Air Washer

The World's Most Complete Line

The Bishop & Babcock Line comprises Vacuum and Vapor low pressure Heating Specialties; a complete system of Automatic Temperature and Humidity Control; Massachusetts Squirrel Cage Fans, Air Washers and Unit Heaters.

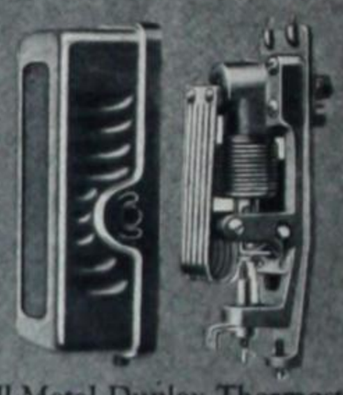
Architects and Engineers who standardize on Bishop & Babcock apparatus insure uniformity in design and operation not to be found in equipment of varied manufacture.

THE BISHOP & BABCOCK SALES CO.
General Offices - - CLEVELAND, OHIO

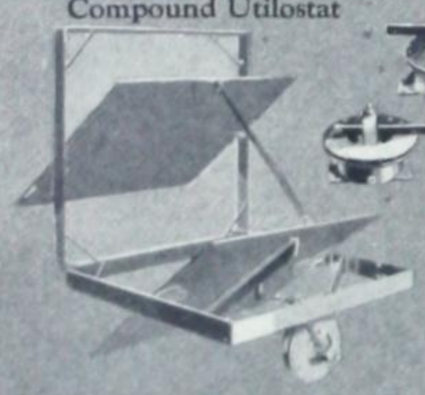


Positive or Graduate Type Thermostat

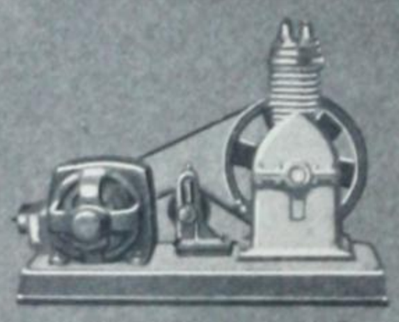
B & B
Compound Utilostat



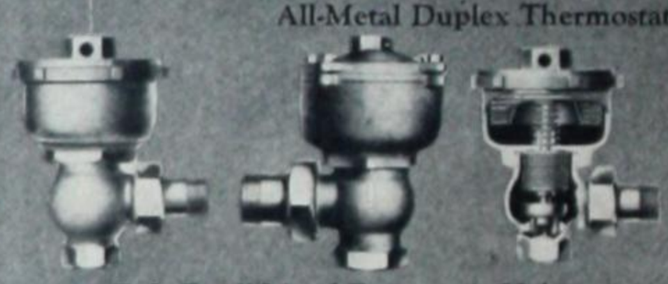
All-Metal Duplex Thermostat



B & B Multiflex
Damper Motors

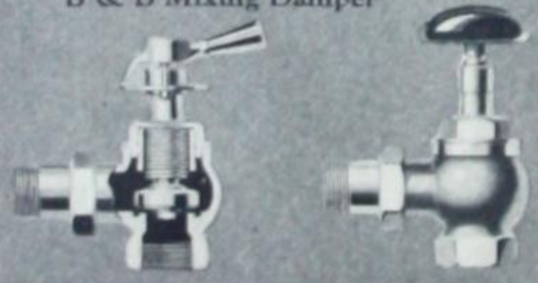


Air Compressor

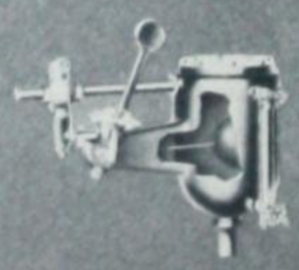


B & B All-Metal Pneumatic Valves

B & B Mixing Damper



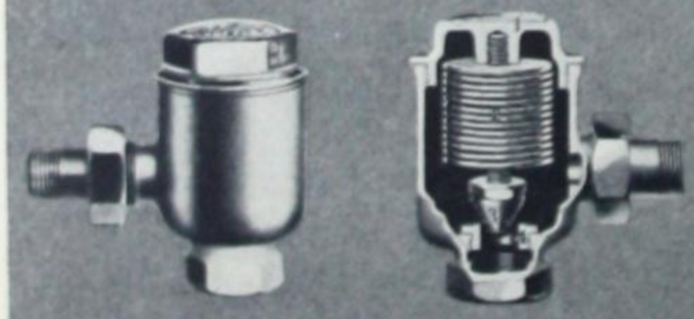
B & B Multiflex Radiator Valves



B & B Alternating Receiver

B & B Special Multiflex Radiator Valves

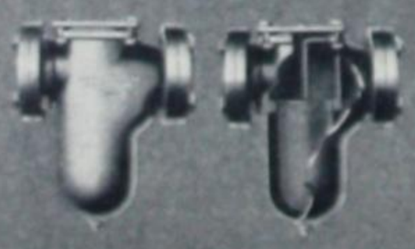
B & B No. 6 Multiflex Trap



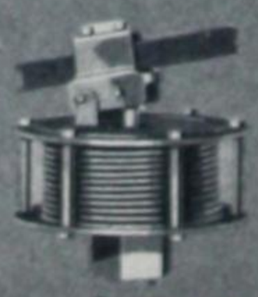
B & B No. 3 Multiflex Trap

B & B 4-V Vent Valve

B & B Blast Trap



B & B Dirt and Suction Strainers



Steam

B & B
Damper
Regulators

Hot Water

B & B Vapor Damper Regulator

The B&B Line